



Volatility in Perspective

Volatility, one measure of risk, should be a consideration when evaluating any investment. Understanding and comparing volatility over time and across indexes provides historical context when assessing an investment's risk.

What Is Volatility?

As a measure of risk, volatility refers to the amount of fluctuation in the returns of a financial instrument or index. An investment is said to have high volatility if its value fluctuates widely. Consider an investment with a relatively low annual volatility of 10% and a long-term expected return of 5%: about 70% of the time its annual returns would range between +15% and -5%. Compare this to another investment with a relatively high volatility of 30% and a long-term expected return of 15%. The range of returns for the more volatile investment would be much wider—ranging from +45% to -15%.

Volatility is generally expressed as a percentage figure that is annualized. Volatility measures are historical and can change significantly over time.

Why Does Volatility Matter?

The volatility of returns is a key dimension of investment risk. Higher-volatility investments may have a higher risk of loss; however, investors typically expect higher returns from them over time.

Investors should compare the volatility characteristics, as well as the return prospects, for any investment or portfolio. The higher the volatility, the wider the range of fluctuations in return—both positive and negative—the investor is likely to experience. Many investors target a level of volatility for their investments based on their tolerance for losses.

In addition, investors should monitor the volatility of their investments as market environments change. Those who are aware of the volatility ranges for a particular index over time can better assess how much their related investment returns may vary under changing market conditions.

Inside: Market Volatility over Time

A chart compares recent and historical volatility for 34 broad and sector indexes.

Measuring Volatility

Typically, volatility is calculated using **standard deviation**. Standard deviation is a statistical measure that captures the range, or variability, of returns around a mean (average) return.

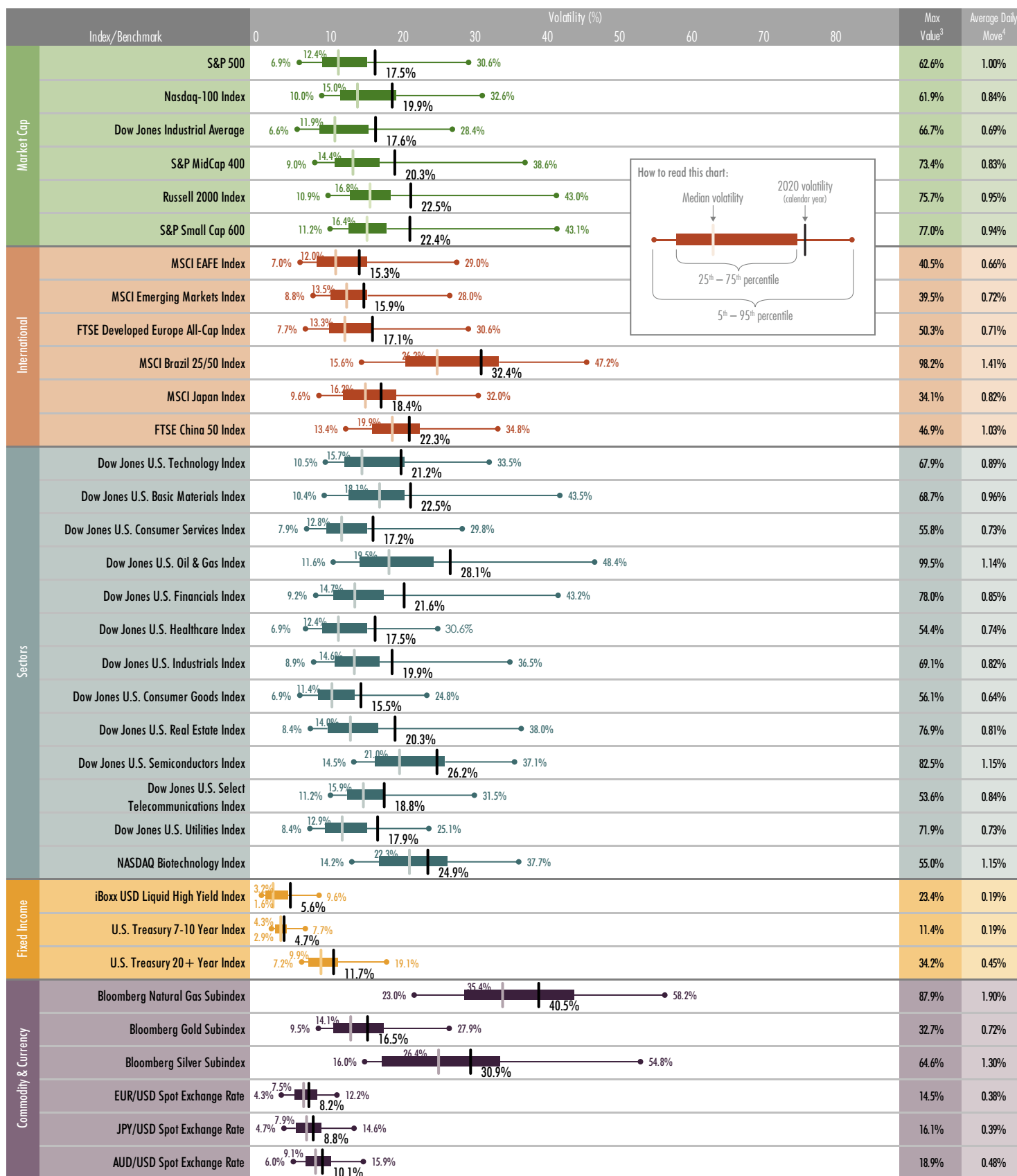
Volatility can be measured using many different units of time. The chart on the next page shows index volatility measures based on the following time periods:

- **Daily return interval** – We used a daily return interval because ETFs, and especially daily leveraged and inverse ETFs, are commonly used by tactical investors with short time horizons.
- **Measurement period** – As a representative holding period for shorter-term investors, we used rolling 3-month¹ periods. Using rolling periods expands the number of data observations and provides perspective on the “typical volatility range” for an index. It also shows how volatility changes over time.
- **10-year historical time frame** – We looked at 10 years of historical volatility data for the indexes. This time frame was sufficiently long to include a range of different economic and market environments, and represented a time frame for which most index data was available.

¹ Three-month volatility based on 63 trading days. **Investing involves risk, including possible loss of principal. Carefully consider the investment objectives, risks, charges and expenses of ProShares before investing. This and other information can be found in their summary and full prospectuses. Read them carefully before investing. Obtain them from your financial professional or visit www.ProShares.com.** ProShares are distributed by SEI Investments Distribution Co. (“SIDCO”), which is not affiliated with the funds’ advisor or sponsor.

Index Volatility Measures: 2011-2020

This chart includes historical volatility measures for 34 broad and sector indexes over a 10-year period (2011-2020). We measured volatility using daily index returns over rolling three-month² periods. See page one for more information about volatility measures.



² Three-month volatility based on 63 trading days. ³ Represents the highest volatility calculated for any three-month (63 trading days) period over the 10 years.

⁴ Represents the average daily price move (up or down) for the index from 2011 to 2020.

For illustrative purposes only. Historical volatility does not predict future volatility. Volatility is not an indication of performance. Source: ProShares Business Intelligence Group, Bloomberg. Volatility is calculated using rolling three-month (63 trading days) periods from 2011 through 2020. Live daily index return data for MSCI Brazil 25/50 is available from 11/22/2012. For the U.S. Treasury 7-10 and 20+ Year Indexes, the daily index return data reflects the ICE U.S. Treasury 7-10 and 20+ Year Indexes from 12/31/2015 onward, and reflects the Bloomberg Barclays U.S. Treasury 7-10 and 20+ Year Indexes prior to 12/31/2015.

The Impact of Volatility on Leveraged and Inverse Fund Returns




Most leveraged and inverse funds are designed to provide a multiple (e.g., 2x or -2x) of the daily returns of an underlying index, before fees and expenses. Investors may use these funds in a variety of ways: to implement a tactical view (long or short) of an index based on an outlook for the economy or segment of the market, to over- or under-weight an index exposure, or to hedge or reduce risk, for example. Leverage can free capital resources for other purposes, such as increasing diversification or maintaining a cash reserve.

As a result of daily rebalancing and compounding, the returns of these funds over time may be greater than or less than the index return times the fund multiple (the “target return”) for the same period. Generally, the greater the volatility of the underlying index, the greater the chance that the return of a leveraged or inverse fund will deviate from the target return over time. Investors should understand how index volatility can impact the returns of leveraged and inverse funds over time:

- When index returns are trending, and volatility is low, compounding can enhance returns, and leveraged and inverse funds can outperform the target return. For example, a 2x fund can return more than two times the return of the index when its index trends up, or lose less than twice the index return when the index trends down.
- When index returns are volatile, compounding can hurt returns, and leveraged and inverse fund returns can underperform the target return. In some circumstances, realized returns can even move in an opposite direction to the target return.

Effect of Daily Rebalancing and Compounding

The table below illustrates hypothetical returns for a 2x fund in upward trending, downward trending and volatile markets.

	Benchmark Return	2x Fund Return
UPWARD TREND 		
Day 1 Return	10%	20%
Day 2 Return	10%	20%
Compounded 2-Day Return	21%	44%
DOWNWARD TREND 		
Day 1 Return	-10%	-20%
Day 2 Return	-10%	-20%
Compounded 2-Day Return	-19%	-36%
VOLATILE PERIOD 		
Day 1 Return	-10%	-20%
Day 2 Return	10%	20%
Compounded 2-Day Return	-1%	-4%

This example shows extreme hypothetical index movements for illustrative purposes only. Actual index movements can be meaningfully different. Example does not reflect investment fees and expenses or taxes, which would lower the results shown.

Geared (leveraged or short) ProShares ETFs seek returns that are a multiple of (e.g., 2x or -2x) the return of a benchmark (target) *for a single day*, as measured from one NAV calculation to the next. Due to the compounding of daily returns, holding periods of greater than one day can result in returns that are significantly different than the target return and ProShares’ returns over periods other than one day will likely differ in amount and possibly direction from the target return for the same period. These effects may be more pronounced in funds with larger or inverse multiples and in funds with volatile benchmarks. Investors should monitor their holdings as frequently as daily. ProShares ETFs entail certain risks, which may include risks associated with the use of derivatives (such as swap agreements, futures contracts and similar instruments), imperfect benchmark correlation, leverage and market price variance, all of which can increase volatility and decrease performance. Please see the summary and full prospectus for a more complete description of risks.

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