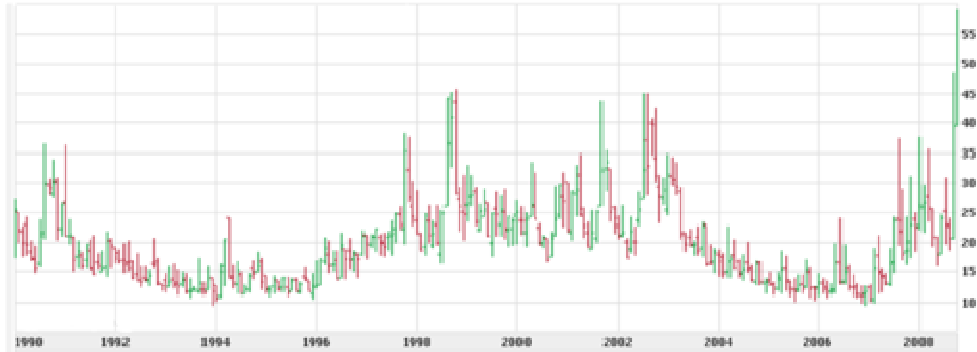


VIX

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VIX Index from inception to Oct. 2008

VIX is the [ticker symbol](#) for the **Chicago Board Options Exchange Volatility Index**, a popular measure of the [implied volatility](#) of [S&P 500 index options](#). A high value corresponds to a more volatile market and therefore more costly options, which can be used to defray risk from volatility.^[1] If investors see high risks of a change in prices, they require a greater premium to insure against such a change by selling options. Often referred to as the *fear index*, it represents one measure of the market's expectation of [volatility](#) over the next 30 day period.

The VIX is calculated and disseminated in real-time by the [Chicago Board Options Exchange](#). It is a [weighted](#) blend of prices for a range of options on the [S&P 500](#) index. The formula uses a [kernel-smoothed estimator](#) that takes as inputs the current market prices for all out-of-the-money calls and puts for the front month and second month expirations.^[2] The goal is to estimate the [implied volatility](#) of the S&P 500 index over the next 30 days.

The VIX has replaced the older VXO as the preferred volatility index used by the media. The VXO still has much significance though, since the VXO charts display a much longer, historical time-line than the VIX.

Interpretation

The VIX is quoted in terms of percentage points and translates, roughly, to the expected movement in the S&P 500 index over the next 30-day period, on an annualized basis. For example, if the VIX is at 15, this represents an expected annualized change of 15% over the next 30 days; thus one can infer that the index option markets expect the S&P 500 to

$$\frac{15\%}{\sqrt{12 \text{ months}}} = 4.33\%$$

move up or down over the next 30-day period. That is, index options are priced with the assumption of a 68% likelihood (one standard deviation) that the magnitude of the S&P 500's 30-day return will be less than 4.33% (up or down).

The price of [call options](#) and [put options](#) can be used to calculate implied volatility, because volatility is one of the factors used to calculate the value of these options. Higher (or lower) volatility of the underlying [security](#) makes an option more (or less) valuable, since there is a greater (or smaller) probability that the option will expire in the money (i.e. with a market value above zero). So a higher option price implies greater volatility, other things being equal.

Investors believe that a high value of VIX translates into a greater degree of market uncertainty, while a low value of VIX is consistent with greater stability.

Note that because the VIX is quoted as a **percentage** rather than a **dollar** amount, there are no highly liquid instruments that will realize the VIX's "return", such as [ETFs](#) can do for regular indices. Nonetheless, VIX-based derivative instruments do exist, including:

- VIX futures contracts, which began trading in 2004, and
- exchange-listed VIX options, which began trading in February 2006.

Similar indices for bonds include MOVE, LBPX indices.

Although the VIX is often called the "fear index," a high VIX is not necessarily bearish for stocks. Instead, the VIX is a measure of fear of volatility in either direction, including to the upside. In practical terms, when investors anticipate large upside volatility, they are unwilling to sell upside "call" stock options unless they receive a large premium. Option buyers will be willing to pay such high premiums only if similarly anticipating a large upside move. The resulting aggregate of increases in upside stock option "call" prices raises the VIX just as does the aggregate growth in downside stock "put" option premiums that occurs when option buyers and sellers anticipate a likely sharp move to the downside. When the market is believed as likely to soar as to plummet, writing any option that will cost the writer in the event of a sudden large move in either direction may look equally risky. Hence high VIX readings mean investors see significant risk that the market will move sharply, whether downward or upward. The highest VIX readings occur when investors anticipate that huge moves in either direction are likely. Only when investors perceive neither significant downside risk nor significant upside potential will the VIX be low.

The [Black-Scholes](#) formula is a quantification of how an option's value depends on the volatility of the underlying assets.

History

Here is a timeline of some key events in the history of the VIX Index:

- 1993 - The VIX Index was introduced in a [paper by Professor Robert E. Whaley of Duke University](#)
- 1993 - The VIX's lowest recorded value (between 1990 and 2008) of 9.48 occurred on Dec 24
- 2003 - [Revised, more robust methodology](#) for the VIX Index was introduced. The underlying index is changed from the CBOE S&P 100 Index (OEX) to the CBOE S&P 500 Index (SPX).
- 2004 - On March 26, 2004, the first-ever trading in futures on the VIX Index began on the [CBOE Futures Exchange \(CFE\)](#).
- 2006 - [VIX options](#) were launched in February 2006.
- 2008 - On October 24, 2008, the VIX reached an intraday high of 89.53.

Between 1990 and October 2008, the average value of VIX was 19.04.

In 2004 and 2006, VIX Futures and VIX Options were each named *Most Innovative Index Product* (respectively) at the Super Bowl of Indexing Conference.

Criticism

Often, when commentators discuss the option markets, the VIX is used to represent overall sentiment for equity options. However, to many practitioners, the relationship of the VIX to individual equity options can be easily overstated. It often appears that different dynamics drive the volatility of index options compared to that of equity options, and the two can often be uncorrelated. In particular, the VIX is limited to a 30-day period, while for most non-index equity options, the most liquidity is usually found in the 2 to 6-month maturities. In addition, volatility is often a function of market sector. For instance, volatility is usually assumed to be high in technology stocks, and low in utility stocks. Using a single number such as the VIX to represent the volatility for all equity options is usually overly simplistic.