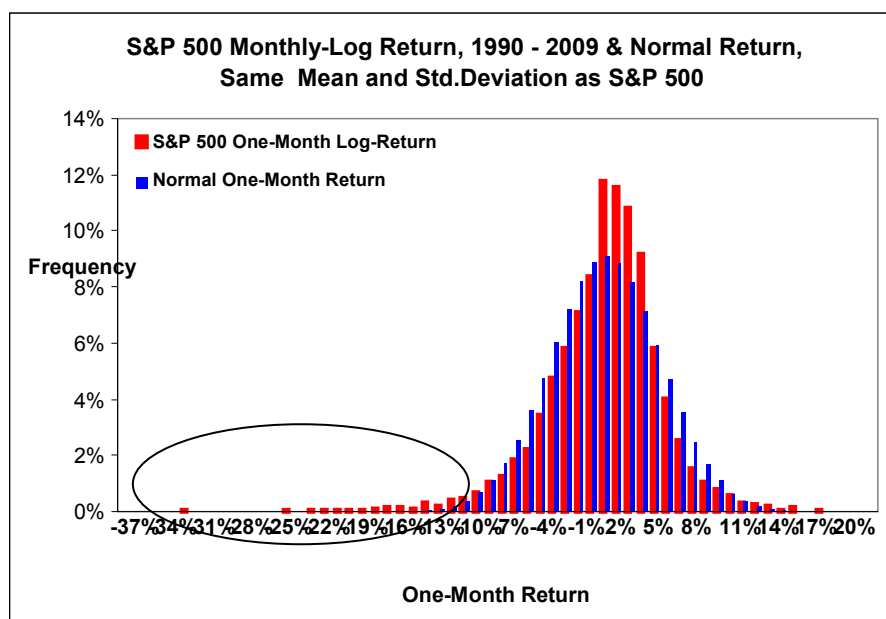


CBOE SKEW INDEX FAQ

1. What is SKEWSM?

The CBOE Skew IndexSM - referred to as "SKEW" - is an option-based indicator that measures the perceived tail risk of the distribution of S&P 500[®] log returns at a 30-day horizon. Tail risk is the risk associated with an increase in the probability of outlier returns, returns two or more standard deviations below the mean. Think stock market crash, or black swan. This probability is negligible for a normal distribution, but can be significant for distributions which are skewed and have fat tails. As illustrated in the chart below, the distribution of S&P 500 log returns has a sizeable left tail. This makes it riskier than a normal distribution with the same mean and the same volatility. SKEW quantifies the additional risk.



Source: CBOE

2. How is SKEW calculated?

SKEW is derived from the price of S&P 500 skewness. That price is calculated from the prices of S&P 500 options using the same type of algorithm as for the CBOE Volatility Index[®] (VIX[®]). The details of the SKEW algorithm and a sample calculation are presented in the SKEW White Paper <http://www.cboe.com/SKEW>. The price of S&P500 skewness is inconvenient to use directly as an index because it is typically a small negative number, for example -.8, -2.3, or -4.3. SKEW converts this price as follows:

$$\text{SKEW} = 100 - 10 * \text{price of skewness.}$$

With this definition, a price of -2.1 translates to a SKEW value of 121. S&P 500 options with 30 days to expiration are generally unavailable. SKEW is therefore interpolated from two "SKEW" values at the maturities of nearby and second nearby options with at least 8 days left to expiration.

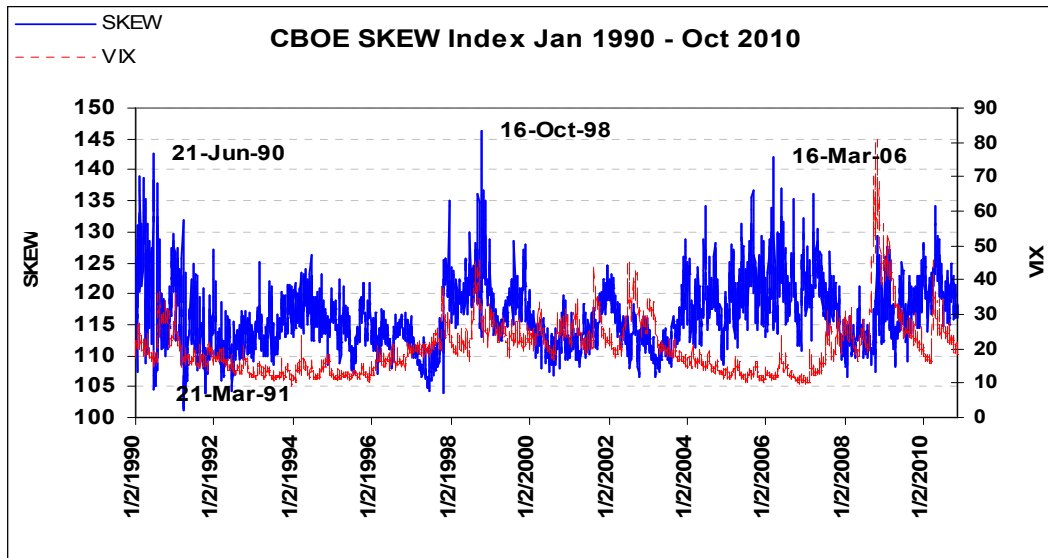
Note that whereas stock indexes almost always have negative skewness, other assets e.g. gold, oil and VIX tend to have positive skewness. If one calculated their SKEW, its value would usually be smaller than 100.

3. How can one interpret the value of SKEW?

The value of SKEW increases with the tail risk of S&P 500 returns. When there is no tail risk, SKEW is equal to 100. Historically, SKEW has varied in a range of 100 to 150 around an average value of 115. The table below illustrates how SKEW can be used to gauge the probabilities of returns two and three standard deviations below the mean. Close to 100, the probability of a steep market decline remains very small. As SKEW rises above 100, this probability increases.

Estimated Risk Adjusted Probability		
SKEW	S&P 500 30-Day Log Return	
	2 Std. Dev	3 Std. Dev.
100	2.30%	0.15%
105	3.65%	0.45%
110	5.00%	0.74%
115	6.35%	1.04%
120	7.70%	1.33%
125	9.05%	1.63%
130	10.40%	1.92%
135	11.75%	2.22%
140	13.10%	2.51%
145	14.45%	2.81%

Past history provides further guidance. From January 1990 to November 2010, SKEW reached an all time low of 101.09 on March 21, 1991. This was close to the end of the recession that started in July 1990. SKEW reached its all time high of 146.88 on October 16, 1998 in the midst of the Russian crisis, and the day after a surprise decision by the Federal Reserve Board to decrease both the target federal fund rate and the discount rate. The value of SKEW was also high in June 1990, immediately before the July 1990 recession, and in March 2006, a period of heightened concern about a possible bursting of the housing market bubble.



Source: CBOE

4. Is SKEW related to VIX ?

SKEW and VIX are different and complementary measures of the risk of 30-day S&P 500 returns. VIX is a close proxy for the standard deviation of those returns. The standard deviation describes the average spread of the distribution of returns around its mean. This is not a sufficient measure of risk because the distribution of S&P 500 log returns is not normal. SKEW describes the tail risk of the distribution. The daily values of SKEW and VIX are uncorrelated, but the range of SKEW tends to narrow for extreme values of VIX.

5. Is SKEW related to the S&P 500 implied volatility curve, aka the "skew"?

SKEW is closely related to the S&P 500 implied volatility "skew" as both depend on investors' perception of tail risk. Prior to the stock market crash of October 1987, investors were not sensitive to tail risk and the curve of S&P 500 implied volatilities had the shape of a smile. Post-crash, investors started to hedge their exposure to tail risk by purchasing S&P 500 puts with low strike prices. This shift in demand bid up the prices of these puts relative to their value under a normal distribution. Black Scholes implied volatilities calculated from their prices therefore increased and transformed the implied volatility smile to a skew. When investors become more concerned about the potential for a market decline, SKEW increases and the implied volatility curve tends to steepen.

6. Is SKEW tradable?

There are currently no futures or options based on SKEW. Speculators and hedgers can take a position in the SKEW portfolio by buying or selling a weighted strip of the S&P 500 options in the portfolio.

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