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## **VIX: Betting on Tomorrow**

The CBOE Volatility Index (better known as the "VIX" index) measures the implied volatility of options written on the S&P 500. At times this index has been described as the "fear index." The VIX should be reflective of the cost of portfolio insurance, which is a method of assessing a portfolio of stocks against the market risk. However, it is not a "fear index" per se, since volatility can be in either a positive or negative direction. A market that might go up substantially could lead to a high VIX rating, just as a market that might go down substantially might. The VIX is not a directional measure of the likelihood of up vs. down market movements.

More formally, the VIX is a measure of market expectations of near-term volatility as conveyed by S&P 500 stock index option prices. Since the introduction of this index in 1993, VIX has often been used by market observers as a measure of investor sentiment and market volatility. It is especially popular as a forward looking volatility measure because unlike backward looking, historically based volatility measures which are plentiful in number, few alternatives exist to measure expectations for future market volatility.

The VIX index was developed by Robert Whaley in 1993 at the request of the Chicago Board Options Exchange (CBOE) as a measure of market expectations of stock market volatility over the next 30 days. The VIX index is owned, calculated and distributed by the CBOE. The VIX measures the volatility of several different S&P 500 options. The VIX is the most popular market-based index for measuring expected future volatility.

The original version of the VIX was calculated based on option prices for puts and calls on the S&P 100 index. However, as S&P 500 options became more popular than S&P 100 options, the VIX calculation methodology was changed in 2003 to instead use S&P 500 option prices. The original methodology was retained at that time for a newly created VXO index.

On March 26, 2004, a futures contract on the VIX index began trading on the CBOE Futures Exchange. In 2006, the CBOE began to trade options on the VIX index, which is a derivative of a derivative.

The calculation formula for the VIX uses a smoothed estimator that takes as inputs the current market prices for all out-of-the-money calls and puts for the most current S&P 500 option contract month as well as the next month's contracts. The primary determinants of implied volatility on an option are the current price of the option, the strike (exercise) price on the option, time to expiration of the options and interest rates. The formula's objective is to estimate the implied volatility of the S&P 500 index for the next 30 days based upon the market prices of these option contracts. A significant drop in price of S&P with option prices not dropping equally by definition means an increased in the implied volatility of the option.

The VIX is the mostly widely followed indicator of expected future market volatility. The VIX was also the first product of its kind to be listed on a Securities and Exchange Commission (SEC) regulated exchange.

One benefit of the VIX is that it supplies an observable metric that can be used to monitor and compare over time changing levels and trends. This permits market watchers and investors to more precisely assess trends in market expectation and prices and respond accordingly. The

highest VIX readings occur when investors anticipate that large moves (in either direction) are likely or at least possible. When investors perceive the possibility of both significant market downside and upside movements as being low, the value of the VIX should be low.

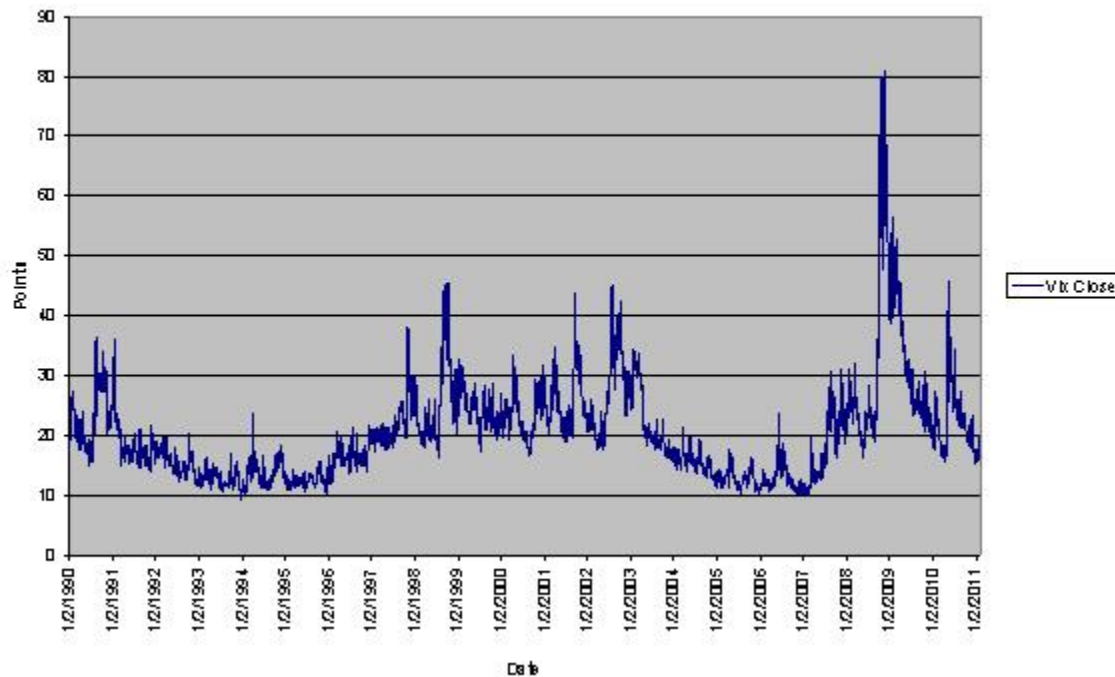
The VIX is quoted in percentage points and translates, roughly, to the expected movement in the S&P 500 index over the next 30-day period, which is then annualized. For example, if the VIX is 15, this represents an expected annualized change of 15% over the next 30 days; thus one can infer that the index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

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

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).

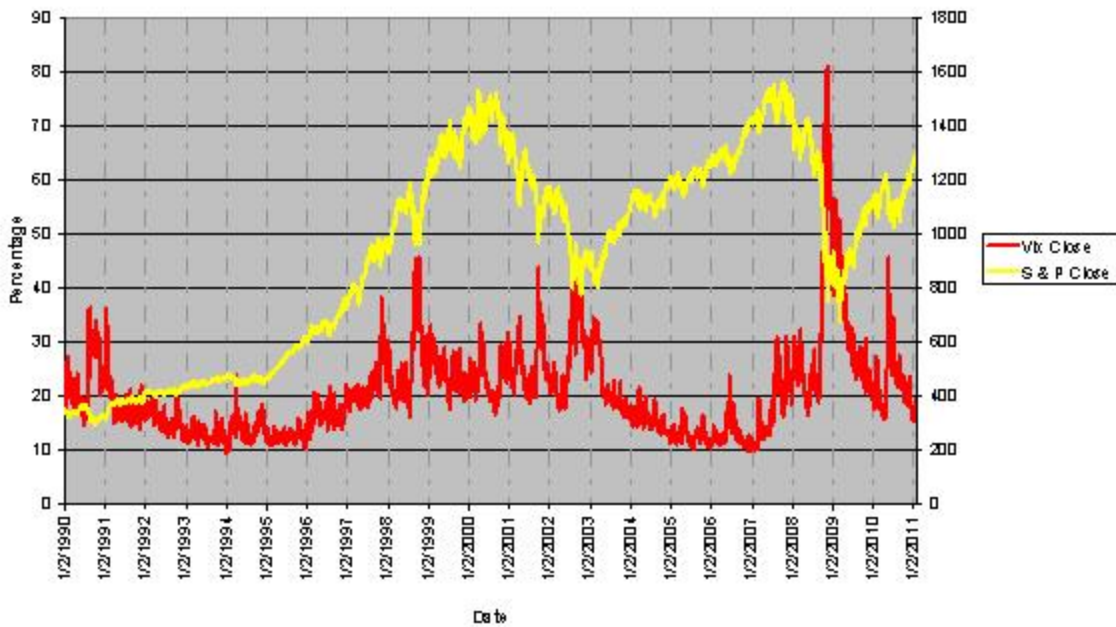
The highest level ever reached on the VIX was 89.53 on October 24, 2008, at about the in crest of the financial crisis. The all time high on the VIX was reached on October 24, 2008 at 89.53 although it closed the day at only 79.13. The level of VIX is displayed over time in the chart below with the VIX reaching its all time peak by a considerable margin in October 2008.

VIX 10 Year Historical Data



The nature of the relationship between changes in equity market price level and the level of the VIX can be seen in this chart:

VIX vs. S & P Index



The methodology originally used in calculating the VIX has also been replicated for use in other markets. For example, the NYSE Euronext has similar products based upon options contracts traded on its exchanges. In the U.S. we have the VXN index based upon the NASDAQ 100 and the VXD based on the Dow Jones Industrial Average.

The most important factor in determining the reliability of a volatility index barometer such as the VIX is active trading in the underlying options across a range of exercise prices. Interestingly, actual historical experience indicates that in fact the VIX is not a significantly better predictor of future volatility than a simple measure of recent past volatility.

February 11, 2011

Major Insurer Share Prices

		Close	Change %			Prior		
			Week	QTD	YTD	Week	Quarter	Year
Life	Aflac	\$57.22	(0.4)	1.4	1.4	\$57.47	\$56.43	\$56.43
	Ameriprise	63.87	10.0	11.0	11.0	58.08	57.55	57.55
	Genworth	13.59	5.3	3.4	3.4	12.91	13.14	13.14
	Lincoln	31.75	2.8	14.2	14.2	30.90	27.81	27.81
	MetLife	48.23	1.9	8.5	8.5	47.34	44.44	44.44
	Principal	32.53	(3.1)	(0.1)	(0.1)	33.56	32.56	32.56
	Protective	29.03	0.5	9.0	9.0	28.89	26.64	26.64
	Prudential	65.14	3.5	11.0	11.0	62.91	58.71	58.71
	UNUM	26.56	3.0	9.7	9.7	25.78	24.22	24.22
PC	ACE	\$63.44	0.6	1.9	1.9	\$63.06	\$62.25	\$62.25
	Axis Capital	37.36	3.2	4.1	4.1	36.20	35.88	35.88
	Allstate	31.39	0.1	(1.5)	(1.5)	31.35	31.88	31.88
	Arch Capital	92.26	2.6	4.8	4.8	89.92	88.05	88.05
	Cincinnati	33.58	1.3	6.0	6.0	33.15	31.69	31.69
	Chubb	59.17	0.8	(0.8)	(0.8)	58.70	59.64	59.64
	Everest Re	88.60	3.8	4.5	4.5	85.39	84.82	84.82
	Progressive	20.15	0.1	1.4	1.4	20.13	19.87	19.87
	Travelers	58.99	2.8	5.9	5.9	57.41	55.71	55.71
	WR Berkley	29.12	0.5	6.4	6.4	28.98	27.38	27.38
	XL	23.24	(0.9)	6.5	6.5	23.44	21.82	21.82
Other	AON	\$49.89	3.6	8.4	8.4	\$48.16	\$46.01	\$46.01
	AIG	41.63	4.1	(13.8)	(13.8)	40.00	48.27	48.27
	Assurant	40.00	1.4	3.8	3.8	39.46	38.52	38.52
	Fidelity National	14.04	0.3	2.6	2.6	14.00	13.68	13.68
	Hartford	29.75	1.8	12.3	12.3	29.23	26.49	26.49
	Marsh	28.80	1.4	5.3	5.3	28.39	27.34	27.34
Health	Aetna	\$37.65	0.6	23.4	23.4	\$37.42	\$30.51	\$30.51
	Cigna	42.92	0.2	17.1	17.1	42.83	36.66	36.66
	Humana	58.31	(3.7)	6.5	6.5	60.54	54.74	54.74
	United	42.38	(0.3)	17.4	17.4	42.49	36.11	36.11
	WellPoint	65.25	0.3	14.8	14.8	65.07	56.86	56.86
Monoline	Assured	\$15.08	1.3	(14.8)	(14.8)	\$14.88	\$17.70	\$17.70
	MBIA	11.28	4.7	(5.9)	(5.9)	10.77	11.99	11.99
	MGIC	10.05	20.2	(1.4)	(1.4)	8.36	10.19	10.19
	PMI	3.34	12.1	1.2	1.2	2.98	3.30	3.30
	Radian	8.03	17.7	(0.5)	(0.5)	6.82	8.07	8.07
	XL Capital	23.24	(0.9)	6.5	6.5	23.44	21.82	21.82

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Major Market Variables

		Close	Change %			Prior		
			Week	QTD	YTD	Week	Quarter	Year
Dow Jones Ind		12,273.26	1.5	6.0	6.0	12,092.15	11,577.51	11,577.51
S&P 500		1,329.15	1.4	5.7	5.7	1,310.87	1,257.64	1,257.64
S&P Financial		229.90	2.9	7.0	7.0	223.52	214.77	214.77
S&P Insurance		198.40	1.8	5.4	5.4	194.96	188.22	188.22
US Dollar \$			Change %			Prior		
/ Euro		\$1.36	(0.2)	1.3	1.3	\$1.36	\$1.34	\$1.34
/ Crude Oil bbl		85.58	(3.9)	(7.2)	(7.2)	89.03	92.22	92.22
/ Gold oz		1,359.90	0.9	(4.3)	(4.3)	1,348.30	1,420.78	1,420.78
Treasury Ylds %		%	Change			%	%	%
1 Year		0.29	0.01	0.02	0.02	0.28	0.27	0.27
10 Year		3.63	(0.01)	0.34	0.34	3.64	3.30	3.30
30 Year		4.69	(0.04)	0.35	0.35	4.73	4.34	4.34
Corp Credit Spreads -bp			Change %			Prior		
CDX.IG		80.12	(1.8)	(5.7)	(5.7)	81.57	85.00	85.00
CDX.XO		150	(3.6)	(21.7)	(21.7)	155.67	191.67	191.67

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