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# Lecture 14: Options Markets

Economics 252, Spring 2011

Prof. Robert Shiller, Yale University

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OPTION/STRIKE	EXP	-CALL-		-PUT-	
		VOL	LAST	VOL	LAST
ACE Ltd	40	Nov	...	...	2500 2.80
AOL TW	20	May	76	2.55	2129 0.85
21.85	22.50	Apr	1493	0.50	619 1.20
21.85	22.50	Jul	963	1.95	14110 2.55
AmOnline	25	Apr	983	0.05	12977 3.30
	21.85	25	May	1196	0.45
	21.85	25	Jul	1339	1 160
	21.85	25	Oct	1706	1.65 14105
	21.85	27.50	Apr	177	0.05 10097
21.85	27.50	Oct	1253	1.15	153 6.40
AT&T Cda	22.50	Oct	...	...	2740 1.90
AT&T	15	Jul	593	1.10	5500 1.10
Abbt L	50	Apr	1231	2.95	605 0.30

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# Black-Scholes Formula

$$C = S\text{N}(d_1) - e^{-rT} E\text{N}(d_2)$$

where

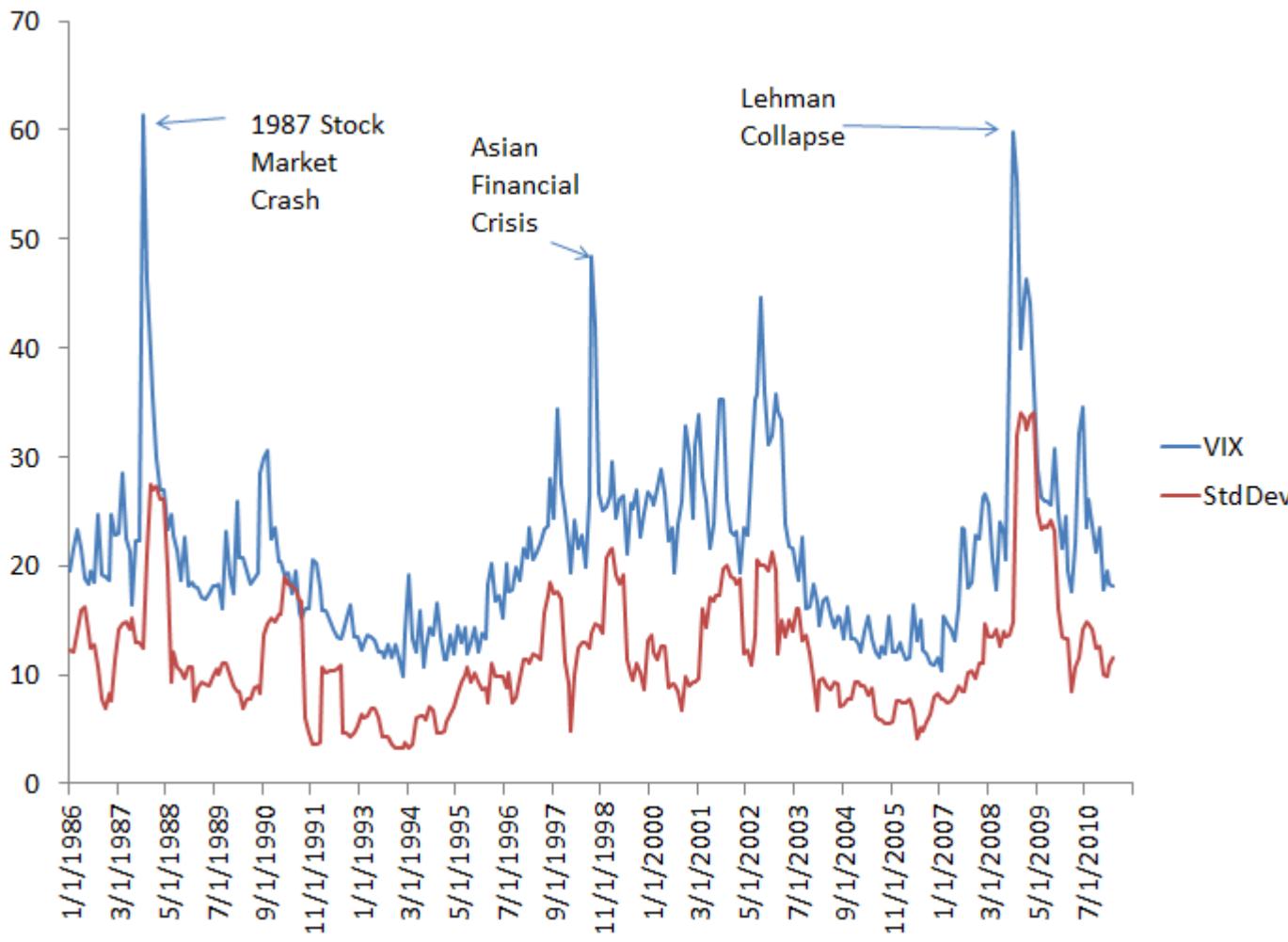
$$d_1 = \frac{\ln(\frac{S}{E}) + rT + \sigma^2 T / 2}{\sigma \sqrt{T}}$$

$$d_2 = \frac{\ln(\frac{S}{E}) + rT - \sigma^2 T / 2}{\sigma \sqrt{T}}$$

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# Implied and Actual Volatility

## Monthly Jan 1986-Mar 2011



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# Actual S&P500 Volatility

## Monthly Jan 1872- March 2011

