

### **Effects of Volatility on the Time Spread**

When purchasing a time spread, the investor should pay attention not only to the movement of the stock price but especially to the movement of volatility.

Volatility plays a very large roll in the price of a time spread and, as we have stated, the time spread is an excellent way to take advantage of anticipated volatility movements in a hedged fashion.

Since the time spread is composed of two options, the investor should understand the role of volatility in options as well as in time spreads. Let's start with option volatility.

An option's volatility component is measured by a term called vega. Vega, one of the components of the pricing model, measures how much an option's price will change with a one point (or tick) change in implied volatility. Based on present data, the pricing model assigns the vega for each option at different strikes, different months and different prices of the stock.

Vega is always given in dollars per one tick volatility change. If an option is worth \$1.00 at a 35 implied volatility and it has a .05 vega, then the option will be worth \$1.05 if implied volatility were to increase to 36 (up one tick) and \$.95 if the implied volatility were to decrease to 34 (down one tick). Remember, vega is given in dollars per one tick volatility change.

As we continue to discuss vega, keep these facts in mind

1. Vega measures how much an option price will change as volatility changes.
2. Vega increases as you look at future months and decreases as you approach expiration.
3. Vega is highest in the at the money options.
4. Vega is a strike-based number – it applies whether the strike is a call or a put.
5. Vega increases as volatility increases and decreases as volatility decreases.

It is important to note that an option's volatility sensitivity increases with more time to expiration. That is, further out-month options have higher vegas than the



vegas of the near term options. The further out you go over time, the higher the vegas become.

Although increasing, they do not progress in a linear manner. When you check the same strike price out over future months you will notice that vega values increase as you move out over future months.

The at-the-money strike in any month will have the highest vega. As you move away from the at-the-money strike, in either direction, the vega values decrease and continue to decrease the further away you get from the at-the-money strike.

Remember, vega (an option's volatility component value) is highest in at-the-money, out-month options. Vega decreases the closer you get to expiration and the further away you move from the at-the-money strike. The chart below shows vega values for QCOM options.

As you look at the chart observe the important elements: the stock price is constant at 68.5; volatility is constant at 40; time progresses from June to January; and finally, the strike price changes from 50 through 80. Notice the increasing pattern as you go out over time. Also notice how the value decreases as you move away from the at-the-money strike.

Strike	June	July	October	January
50	0	.008	.064	.114
55	.004	.030	.102	.153
60	.023	.063	.135	.184
65	.053	.090	.157	.205
70	.056	.094	.165	.215
75	.032	.077	.154	.213
80	.011	.052	.142	.203

Another important fact about vega is that it is a strike-based number. That means that the vega number does not differentiate between put and call. Vega tells the volatility sensitivity of the strike regardless of whether you are looking at puts or calls. So, the vega number of a call and its corresponding put are identical.

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