

My Option Has Greeks?



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In order to simplify the computations, commissions, fees, margin interest and taxes have not been included in the examples used in these materials. These costs will impact the outcome of all stock and options transactions and must be considered prior to entering into any transactions. Investors should consult their tax advisor about any potential tax consequences.

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Session Outline

- Delta
 - Theta
 - Gamma
 - Vega
 - Volatility and Pricing
 - Vertical Spread
- Greeks**
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DELTA

- In-the-Money Calls Delta > 0.50
- At-the-Money Calls Delta ≈ 0.50
- Out-of-the-Money Calls Delta < 0.50

DELTA

- **ABC Stock @ 50**
- **28 Days to Expiration**

DELTA

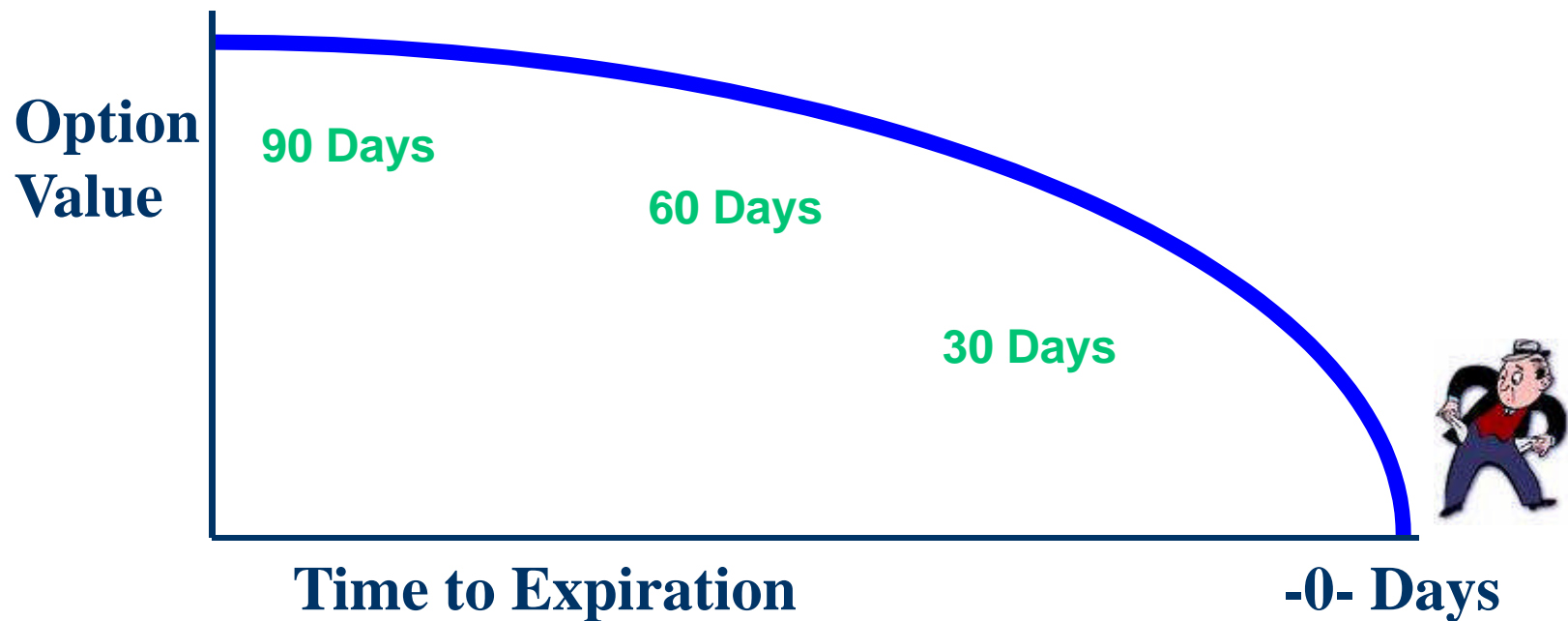
■ 45 Call	5.00	+ .89
■ 50 Call	1.85	+ .51
■ 55 Call	.30	+ .10

Time Decay

- Theta is time decay.
- A theta of .15 indicates an option will decrease in value by 15 cents during one unit of time. (That's one day).



Time Decay



Options may erode as time passes. Different options decrease in value at different rates. (In, At, Out)

Gamma

50 Call Behavior

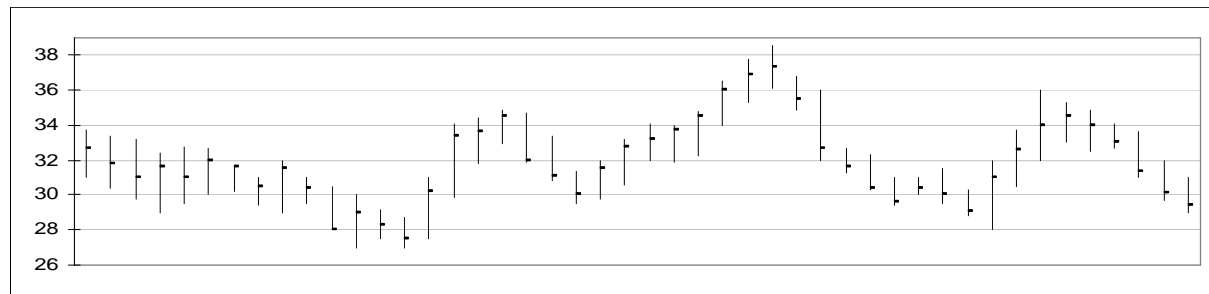
<u>Stock</u>	<u>Price</u>	<u>Delta</u>	<u>Gamma</u>
48	2.00	.30	.09
49	2.30	.39	.09
50	2.69	.48	.07
51	3.17	.55	.06

Vega

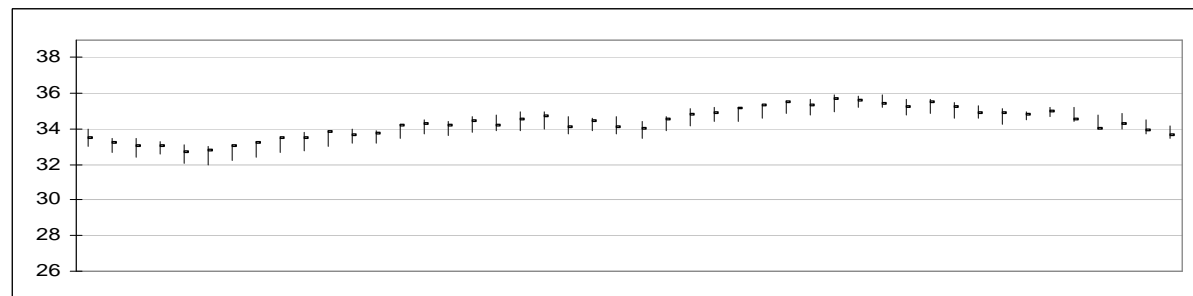
- Vega – the change in an option's theoretical value for a one-percent change in volatility.
- Option prices change as volatility changes.
- Increase in volatility cause option prices to rise.

Volatility Means Movement

High
Volatility



Low
Volatility



Vega

ABC @ 50

28 Days to Expiration

<u>Option</u>	<u>Vol 20</u>	<u>Vega</u>	<u>Vol 30</u>
45 Call	6.50	.02	6.70
47.5 Call	4.25	.03	4.55
50 Call	2.60	.04	3.00
52.5 Call	1.30	.04	1.70

What's the Volatility?

Stock Price	\$47	
Strike Price	50	50 Call
Days to Exp	35	Market Price
Interest Rates	2%	1.60
Dividend Yield	0%	
Volatility	42.9%	INPUTS

OUTPUT ↑



How Volatility Affects Option Prices

Stock Price	\$65.00	<u>Volatility up:</u> Call prices and Put prices both increase
Strike Price	65.00	
Time	80 days	
Interest Rates	2%	
Dividends	0%	
<u>Volatility</u>	<u>40%</u> → <u>60%</u>	
Call Price	5.00	7.40
Put Price	4.70	7.10

What We Expect

Stock Price	\$21.00	⇒ \$24.00
Strike Price	25.00	
Time	60 days	⇒ 39 days
Interest Rates	2%	(3 wks pass)
Dividends	0%	
<u>Volatility</u>	<u>70%</u>	<u> </u>
25 Call Price	1.00	⇒ 2.00

What Sometimes Happens

Stock Price	\$21.00	⇒ \$24.00
Strike Price	25.00	
Time	60 days	⇒ 39 days
Interest Rates	2%	(3 wks pass)
Dividends	0%	
<u>Volatility</u>	<u>70%</u>	⇒ <u>40%</u>
25 Call Price	1.00	⇒ 1.00

Vertical Spread

- The purchase of one option and sale of another option with the same underlying and the same expiration date, but with a different strike price.
- Example:

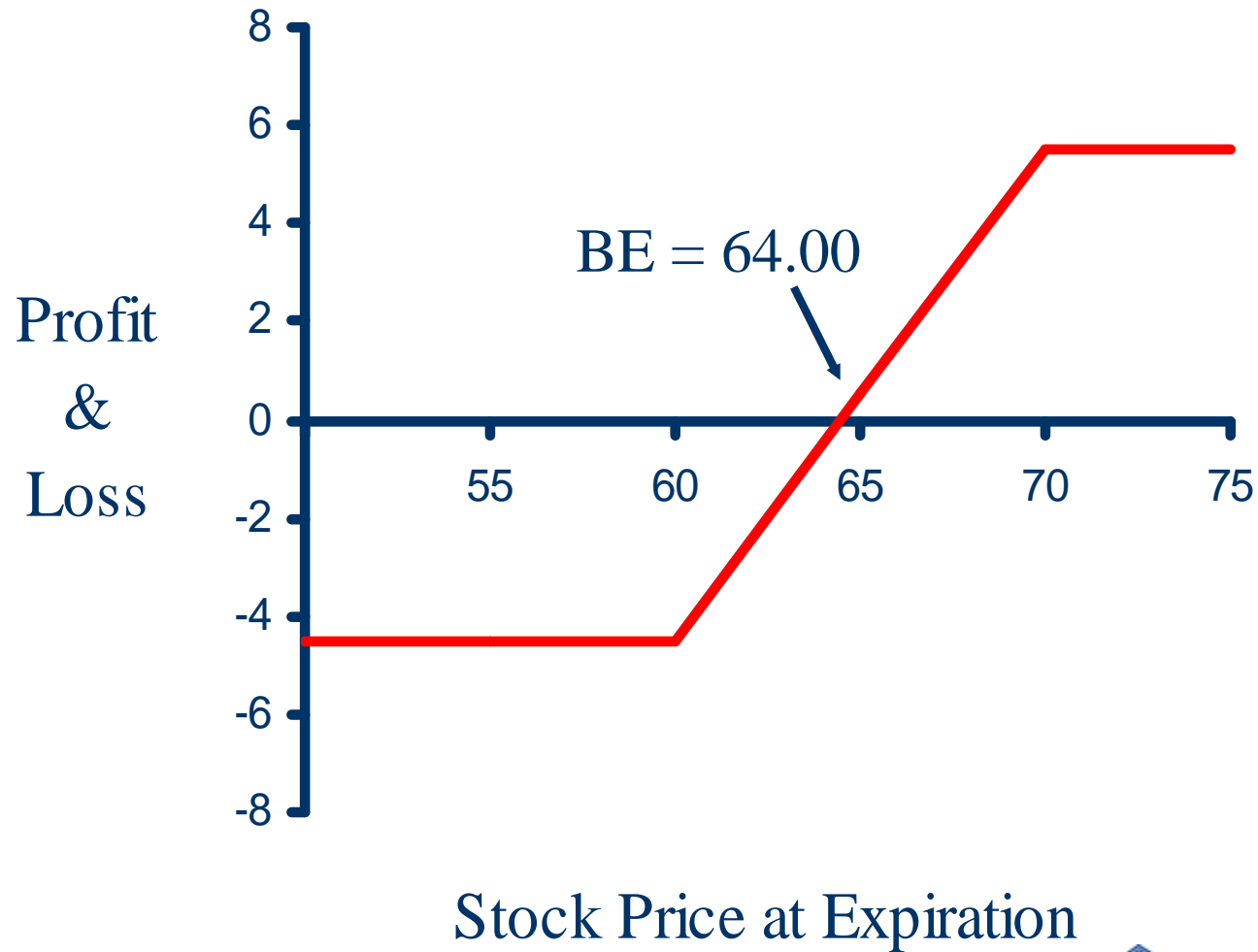
Long 1 XYZ 60 Call @	5.60
Short 1 XYZ 70 Call @	<u>1.60</u>
Net Debit (Cost)	4.00

Vertical Call Spread

- XYZ @ 63
- Buy 1 XYZ 75-day 60 Call @ 5.60
Sell 1 XYZ 75-day 70 Call @ 1.60
Net Debit 4.00

- Max Profit = **10.00 – 4.00 = 6.00**
- Max Loss = **4.00 (debit paid)**
- Break-Even (BE) = **60 + 4.00 = 64.00**

Vertical Call Spread P&L Diagram



Spread It Off

	<u>Price</u>	<u>Δ</u>	<u>g</u>	<u>v</u>	<u>t</u>
+1 60 Call	5.60	+.65	+.036	+.11	-.20
-1 70 Call	<u>1.60</u>	<u>-.28</u>	<u>-.035</u>	<u>-.10</u>	<u>+.17</u>
Net	4.00	+.37	+.001	+.01	-.03

Stock Price: \$62.70

Volatility: 35%

The Greeks Defined

- Delta – change in an option's theoretical value for a one-unit change in price of the underlying
- Gamma – change in delta for a one-unit change in price of the underlying
- Theta - change in an option's theoretical value for a one-unit change in time to expiration.
- Vega - change in an option's theoretical value for a one-percent change in volatility.

Summary

- Understand the affects of greeks on option pricing
- Volatility up – option prices up
- Volatility down – option prices down
- Spreads spread off volatility and time decay
- Determine volatility and price range expectations.