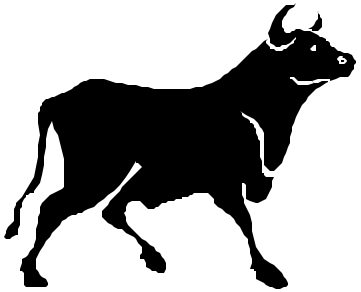
Advanced Strategies For Option Trading Success

The Chicago Board Options Exchange



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Disclaimer

Options involve risks and are not suitable for everyone. Prior to buying or selling options, an investor must receive a copy of *Characteristics and Risks of Standardized Options*. Copies may be obtained from your broker or from the Chicago Board Options Exchange at LaSalle at Van Buren, Chicago, IL 60605.

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.

Any strategies discussed, including examples using actual securities and price data, are strictly for illustrative and educational purposes only and are not to be construed as an endorsement, recommendation, or solicitation to buy or sell securities. Past performance is not a guarantee of future results.

What does “advanced” mean?

Understanding Implied Voaltility

Multiple-Part Strategies

Three-Part Forecasting

Presentation Outline

1. The Importance of Implied Volatility
2. Unique aspects of options-related forecasting
3. The “Greeks”
4. Trading straddles and ratio spreads
5. Volatility skews

The Problem

SPX	1306	1330
Days to Expiration	32	31
1375 Call	15 1/4	13 7/8

Volatility

What is it?

How does it affect option prices?

What do I need to know?

Insurance vs. Options

Insurance	**Options**
Asset Value	Stock Price
Deductible	Strike Price
Time	Time
Interest Rates	Int Rate & Div
Risk	Volatility
= Premium	= Premium

VOLATILITY IS A MEASURE OF RISK

Mathematical definition

Intuitive understanding

Theoretical Option Values

The Black-Scholes option pricing model takes the six inputs and calculates a “theoretical value” for the option.

Theoretical Option Values

Stock Price	**$50**	
Strike Price	**50**	**50 Call**
Days to Exp	**90**	**Theor. Val.**
Int. Rates	**4**	**??**
Dividends	**0**	
Volatility	**30%**	

Theoretical Option Values

What if we know the market price of an option, but we do not know the volatility?

Finding “The Volatility”

Stock Price	$73	
Strike Price	75	75 Call
Days to Exp	58	Market Price
Int. Rates	4	3 5/8
Dividends	0	
Volatility	??	

Implied Volatility Defined

The volatility percentage used in an option pricing formula that returns the market price of an option as the theoretical value.

Supply and Demand Determine Option Prices

Implied volatility can be used used in a subjective way to evaluate the market price price of an option.

Changing Implied Volatility

Date	DJX	Dec 78 Call	Imp Vol.
10/22	80.35	3 7/8	??

Changing Implied Volatility

Date	DJX	Dec 78 Call	Imp Vol.
10/22	80.35	3 7/8	18.7%
10/23	78.48	3 3/8	??

Changing Implied Volatility

Date	DJX	Dec 78 Call	Imp Vol.
10/22	80.35	3 7/8	18.7%
10/23	78.48	3 3/8	24.8%
10/24	77.15	2 3/4	25.7%

Changing Implied Volatility

Date	DJX	Dec 78 Call	Imp Vol.
10/22	80.35	3 7/8	18.7%
10/23	78.48	3 3/8	24.8%
10/24	77.15	2 3/4	25.7%
10/27	71.61	1 7/8	38.9%
10/28	74.98	??	??

Changing Implied Volatility

Date	DJX	Dec 78 Call	Imp Vol.
10/22	80.35	3 7/8	18.7%
10/23	78.48	3 3/8	24.8%
10/24	77.15	2 3/4	25.7%
10/27	71.61	1 7/8	38.9%
10/28	74.98	1 3/4	26.3%

Day 1 - Open Trade	Day 2 - Close Trade
Stock Price	Stock Price
Strike Price	Strike Price
Days to Exp.	Days to Exp.
Int Rates & Div	Int. Rates & Div
Implied Volatility	Implied Volatility
= Mkt Px of Option	= Mkt Px of Option

WHICH COMPONENTS CHANGE?

Types of Volatility

- **Historical**
  actual volatility during a specified time period
- **Future**
  actual volatility from present to option expiration
- **Implied**
  volatility that justifies an option's current market price
- **Forecasted**
  estimate of future volatility used in computer models to calculate theoretical values

Three-Part Forecast

Underlying Price

Time to Expiration

Implied Volatility

Realistic Expectations Depend on 4 Questions:

1. I buy/sell the option today
2. If my forecast is correct...
3. What will the option price be?
4. Is that OK?

Speaking Greek - DELTA

Rate of change in option theoretical value for one-point change in underlying stock price

i.e. ‘how much the option acts like stock’

Speaking Greek - GAMMA

Change in an option's delta for a one-point change in underlying stock price

- not constant
- highest for near-term, at-the-money options

Note: Gamma is a sophisticated concept; it may not necessarily be pertinent to non-professional traders

Speaking Greek - Delta/Gamma

The impact of changing stock price.

Stock Price	$100	$101	$110
Price of 100 Call	7 5/8	8 1/4	14 1/4
Delta	0.56	0.58	0.74
Gamma	0.021	0.021	0.016

(Days to Expiration, 60, and Implied Volatility, 45%, unchanged)

Speaking Greek - Delta/Gamma

The impact of changing time on delta and gamma.

Days to Expiration	120	60	15
Price of 100 Call	11	7 5/8	3 3/4
Delta	0.58	0.56	0.53
Gamma	0.015	0.021	0.043
Price of 110 Call	7 1/8	3 7/8	3/4
Delta	0.44	0.36	0.17
Gamma	0.015	0.020	0.027

(Stock Price, $100, and Implied Volatility, 45%, unchanged)

Speaking Greek - Delta/Gamma

The impact of changing strike price on delta and gamma.

Price of 100 Call	7 5/8	Price of 110 Call	3 7/8
Delta	0.56	Delta	0.36
Gamma	0.021	Gamma	0.020
Price of 105 Call	5 5/8	Price of 115 Call	2 3/4
Delta	0.45	Delta	0.27
Gamma	0.021	Gamma	0.018

(Stock Price, $100, Implied Volatility, 45%, Days to Exp., 60)

GAMMA (cont.)

- Is it better to buy high-gamma options?
- What is the trade-off for owning high-gamma options?

Speaking Greek - Theta

A measure of the rate of change in an option's price for a one-point change in the time to the option's expiration.

Time Decay is Enemy #?
for option buyers.

Speaking Greek - Theta

The impact of changing time on option prices.

Days to EXP.	120	60	15
Price of 100 Call	11	7 5/8	3 3/4
Theta	-0.049	-0.067	-0.129
Price of 110 Call	7 1/8	3 7/8	3/4
Theta	-0.048	-0.061	-0.073

(Stock Price, $100, and Implied Volatility, 45%, unchanged)

Speaking Greek - Vega

Rate of change in an option's price for a one-percent change in volatility.

Volatility is Enemy #? for option buyers.

Speaking Greek - Vega

The impact of changing volatility on option prices.

VOLATILTIY	45%	46%	90%
Price of 100 Call	7.654	7.814	14.827
Vega	0.160	0.160	0.158
Price of 110 Call	3.919	4.071	11.071
Vega	0.150	0.151	0.161

(Stock Price, $100, and Days to Expiration, 60, unchanged)

Speaking Greek - Vega

The impact of changing time on option vegas.

Days to EXP.	120	60	15
Price of 100 Call	11	7 5/8	3 3/4
Vega	0.225	0.160	0.081
Price of 110 Call	7 1/8	3 7/8	3/4
Vega	0.225	0.150	0.050

(Stock Price, $100, and Implied Volatility, 45%, unchanged)

Strategy Selection

Forecast (as of 8/17/01):

Stock Price	$17.50 ✍ $35
Time.	5 mo. (Jan ‘02 Exp.)
Imp. Volatility	55% ✍ 45%
Risk Capital:	$3,000

Options Under Consideration

Jan 02	20 Call	1.95	Buy 15	($2,925)
Jan 02	30 Call	.35	Buy 85	($2,975)
Jan 03	20 Call	3.90	Buy 7	($2,730)
Jan 03	30 Call	1.65	Buy 18	($2,970)
Jan 03	40 Call	.75	Buy 40	($3,000)

Note: Commissions are not included.

Results at:	$17.50	$25	$35
02/20 Call	-100%	+156%	+ 669%
02/30 Call	-100%	-100%	+1,330%
03/20 Call	- 35%	+ 95%	+ 320%
03/30 Call	- 58%	+ 93%	+ 472%
03/40 Call	- 74%	+ 66%	+ 580%

Preparing for a Trade

Step 1: Calculate the implied volatility of each option under consideration

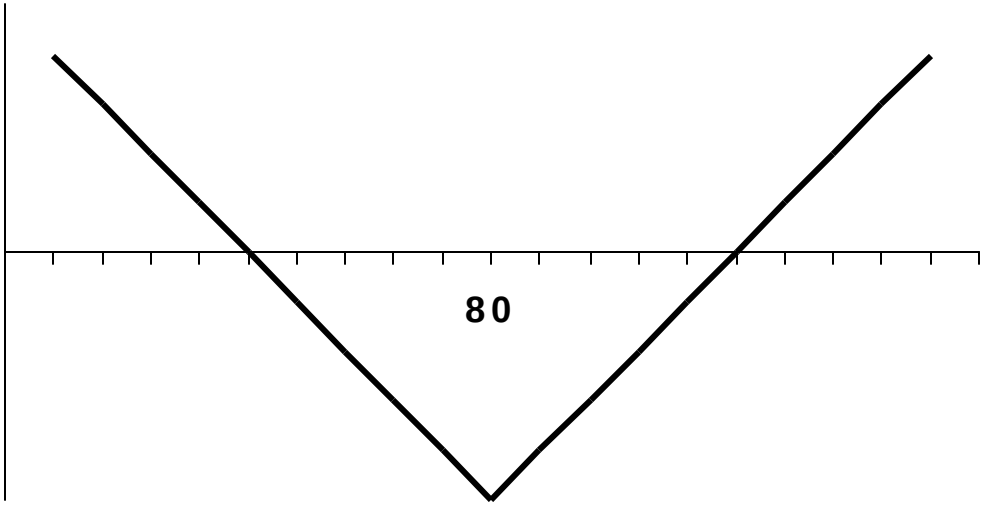
Step 2: State your 3-part forecast
Underlying Price, Time, Imp Vol

Step 3: Estimate option prices assuming the forecast is correct.

Step 4: Calculate the profit/loss of each strategy and weigh trade-offs.

Long Straddles

Long a call and long a put with the same strike price and expiration.



Long Straddles

Example: Buy 1 80 Call @ 3 3/4

and Buy 1 80 Put @ 3 1/4

Total Cost 7

Question: If the stock price rises or falls by $4 in one week, the price of the $80 Straddle can be expected to change from 7 to what price?

Long Straddles

$80 Straddle - Theoretical Values - Vol. 30%, Rates 4%

Stock Price	49 Days	42 Days	35 Days	28 Days	21 Days	14 Days	7 Days	EXP
96	16 3/4	16 5/8	16 1/2	16 1/4	16 1/8	16	16	16
92	13 1/4	12 7/8	12 3/4	12 1/2	12 1/4	12 1/8	12	12
88	10 1/4	9 7/8	9 1/2	9	8 5/8	8 3/8	8	8
84	8	7 1/2	7	6 1/2	5 7/8	5 1/8	4 3/8	4
80	7	6 1/2	6	5 1/4	4 5/8	3 3/4	2 5/8	0
76	7 3/8	6 7/8	6 1/2	6	5 1/2	4 7/8	4 1/4	4
72	9 1/4	8 7/8	8 5/8	8 3/8	8 1/8	8	8	8
68	12 1/4	12 1/8	12 1/8	12	12	12	12	12
64	16	16	16	16	16	16	16	16

Long Straddles

Stock Price	$80 -->	$84 (1 week)
$80 Straddle	7 -->	7 1/2

Stock Price	$80 -->	$74 (1 week)
$80 Straddle	7 -->	6 7/8

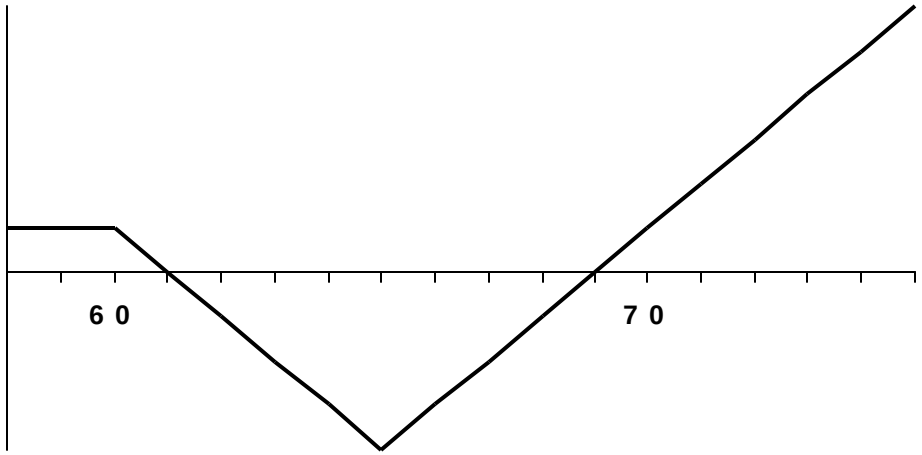
Long Straddles

CONCLUSION

The forecast must predict a price change larger than $4 in 1 week to justify the purchase of this straddle.

1x2 Ratio Volatility Spread with Calls

Short 1 call with a lower strike and long 2 calls with a higher strike.



1x2 Ratio Volatility Spread with Calls

Example: Sell 1 60 Call @ 2 3/4

and Buy 2 65 Calls @ 1 ea.

Net Credit 3/4

Question: What will the spread price be, and how much will you make, if the stock price rises to $69 in one week?

1x2 Ratio Volatility Spread with Calls

$60-$65 1x2 Ratio Volatility Spread - Theoretical Values - Vol. 30%, Rates 4%

Stock Price	49 Days	42 Days	35 Days	28 Days	21 Days	14 Days	7 Days	EXP
81	(11 1/2)	(11 1/2)	(11 1/2)	(11 1/4)	(11 1/8)	(11 1/8)	(11)	(11)
78	(8 5/8)	(8 1/2)	(8 1/2)	(8 1/4)	(8 1/8)	(8 1/8)	(8)	(8)
75	(5 7/8)	(5 3/4)	(5 3/4)	(5 1/2)	(5 3/8)	(5 1/8)	(5)	(5)
72	(3 1/2)	(3 1/8)	(3 1/8)	(2 3/4)	(2 5/8)	(2 1/8	(2)	(2)
69	(1 5/8)	(1 1/4)	(7/8)	(5/8)	(1/4)	1/8	3/4	1
66	0	0	3/8	3/4	1 3/8	2	2 5/8	4
63	5/8	3/4	1	1 1/4	1 1/2	2	1 3/4	3
60	3/4	7/8	1 1/8	1 1/8	1 1/8	1 1/4	1	0
57	5/8	3/4	1/2	5/8	1/2	3/8	1/8	0

Parenthesis indicate the spread can be established for a debit or closed for a credit.

No parenthesis indicate the spread can be established for a credit or closed for a debit.

1x2 Ratio Volatility Spread with Calls

Stock Price	$63	-->	$69 (1 week)
Ratio Vol Sprd	3/4 CR	-->	1 1/4 DR
	Profit		**2**

Is the estimated result satisfactory?

Time Spreads

Long a call with a later expiration date and short a call with an earlier one.

Example: Long 1 DEC 50 Call @ 2.60

Short 1 SEP 50 Call @ 1.00

Net Debit: 1.60

Time Spreads

Stock Price: $46

Buy 1 90-day 50 Call @ 2.60 and

Sell 1 30-day 50 Call @ 1.00

Question: If the stock price rises by $4, the price of this time spread can be expected to change from 1.60 to what price?

Time Spreads

Stock Price $46 --> $50			(start 1.60)
(1 wk)	S-T Call 2.30	L-T Call 4.40	**SPD 2.10**
(2 wks)	S-T Call 1.90	L-T Call 4.20	**SPD 2.30**
(3 wks)	S-T Call 1.40	L-T Call 4.00	**SPD 2.60**
(at Exp)	S-T Call 0.00	L-T Call 3.70	**SPD 3.70**

Time Spreads

Stock Price $46 --> $46 (start 1.60)

(1 wk)	S-T Call 0.75	L-T Call 2.50	**SPD 1.75**
(2 wks)	S-T Call 0.45	L-T Call 2.30	**SPD 1.85**
(3 wks)	S-T Call 0.20	L-T Call 2.15	**SPD 1.95**
(at Exp)	S-T Call 0.00	L-T Call 1.90	**SPD 1.90**

Diagonal Time Spreads

Long a call with a later expiration date and short a call with a higher strike price and an earlier expiration date.

Example: Long 1 DEC 45 Call @ 4.70

Short 1 SEP 50 Call @ 1.00

Net Debit: 3.70

Diagonal Time Spreads

Stock Price: $46

Buy 1 90-day 45 Call @ 4.70 and

Sell 1 30-day 50 Call @ 1.00

Question: If the stock price rises by $4, the price of this time spread can be expected to change from 3.70 to what price?

Diagonal Time Spreads

Stock Price $46 --> $50			(start 3.70)
(1 wk)	S-T Call 2.30	L-T Call 7.20	**SPD 4.90**
(2 wks)	S-T Call 1.90	L-T Call 7.00	**SPD 5.10**
(3 wks)	S-T Call 1.40	L-T Call 6.85	**SPD 5.45**
(at Exp)	S-T Call 0.00	L-T Call 3.70	**SPD 6.60**

Diagonal Time Spreads

Stock Price $46 --> $46			(start 3.70)
(1 wk)	S-T Call 0.75	L-T Call 4.50	**SPD 3.75**
(2 wks)	S-T Call 0.45	L-T Call 4.35	**SPD 3.90**
(3 wks)	S-T Call 0.20	L-T Call 4.15	**SPD 3.95**
(at Exp)	S-T Call 0.00	L-T Call 1.90	**SPD 3.90**

SUMMARY

There is a decision-making process:

Trade in units of capital

(not in numbers of contracts)

Make a 3-part forecast

Underlying price, time period, impl. vol.

Know implied volatility levels

Analyze more than one alternative