Ratio Spreads

Mechanics, Motivation & Managing

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Disclaimer

In order to simplify the computations, commissions have not been included in the examples used in these materials. Commission costs will impact the outcome of all stock and options transactions and must be considered prior to entering into any transactions.

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.

Options involve risks and are not suitable for everyone. Prior to buying or selling an option, 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, 400 S. LaSalle, Chicago, IL 60605. Investors considering options should consult their tax advisor as to how taxes may affect the outcome of contemplated options transactions.

Session Outline

Ratio Spreads – How They Work

Why Use Ratio Spreads?

Price Behavior

Managing Ratio Spreads

A Judgment-Based Approach

Ratio Spread Defined

The term “ratio spread” is loosely used to describe any multiple-part option position in which there are an unequal number of long and short options at different strikes

Typically, the term “ratio spread” implies that there are more short options than long options, and the term “volatility spread” (or “back spread”) implies more long options than short.

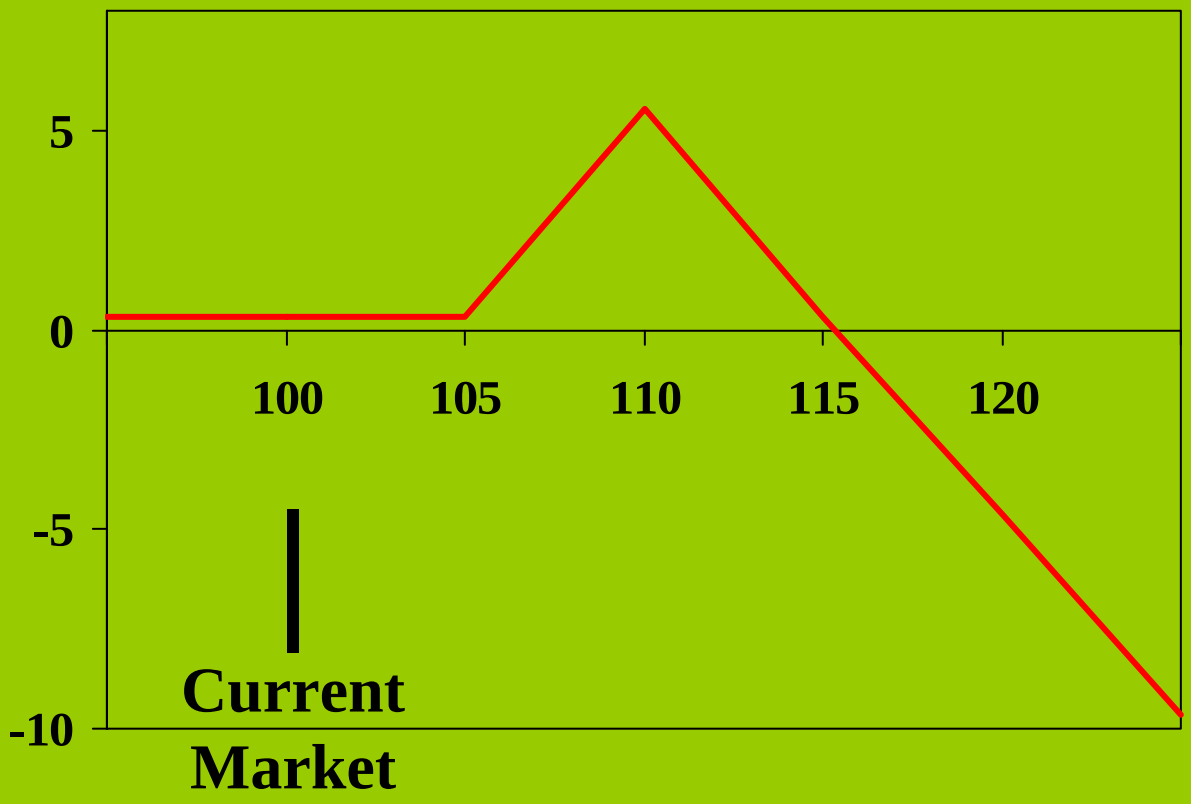
Note: multiple commissions are involved

1×2 Ratio Spread with Calls

+1	35-day 105 Call	2.99	(2.99)
–2	35-day 110 Call	1.67 ea.	3.34
		Net credit:	0.35

Underlying price = 100

The Ratio Spread with Calls at Exp

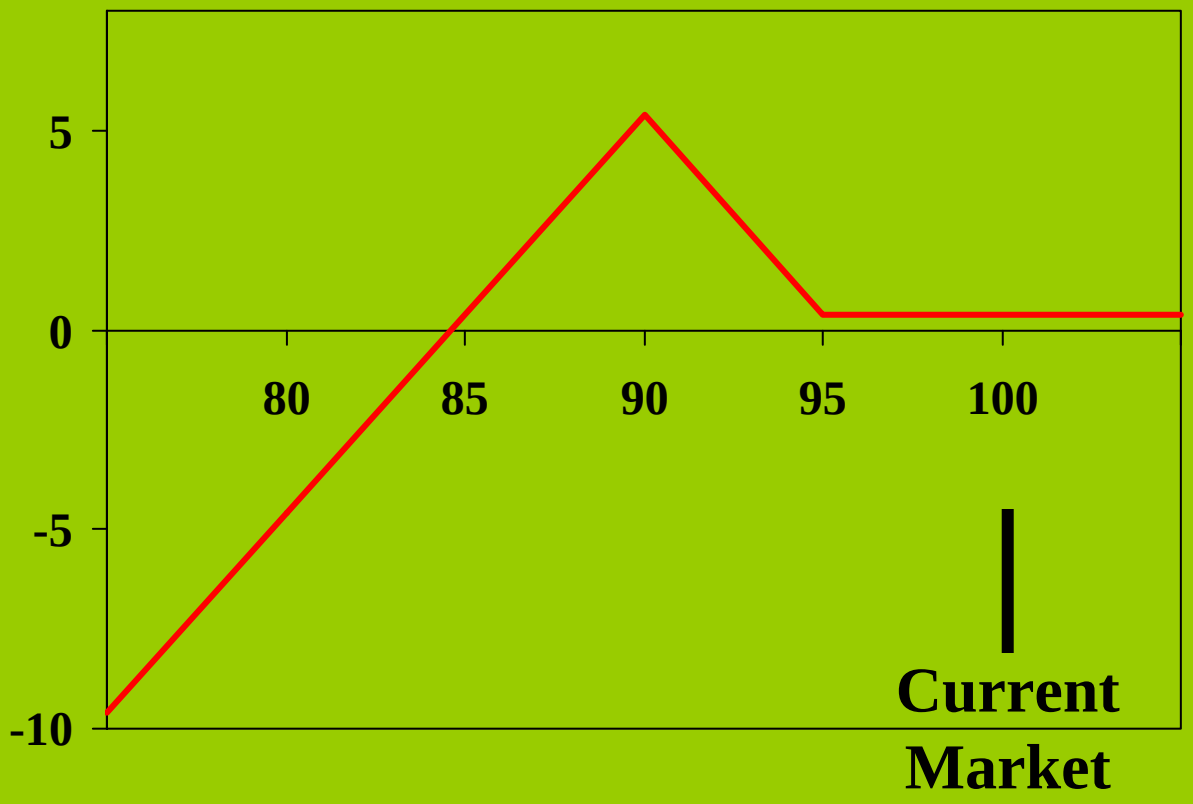


1×2 Ratio Spread with Puts

+1	35-day	95 Put	2.70	(2.70)
–2	35-day	90 Put	1.55 ea.	3.10
			Net credit:	0.40

Underlying price = 100

The Ratio Spread with Puts at Exp



Ratio Spreads – the Motivation

+1	35-day 105 Call	2.99	(2.99)
–2	35-day 110 Call	1.67 ea.	3.34
		Net credit:	0.35

Margin requirement: **$2,200**

Annualized return if all options expire worthless **≈16%**

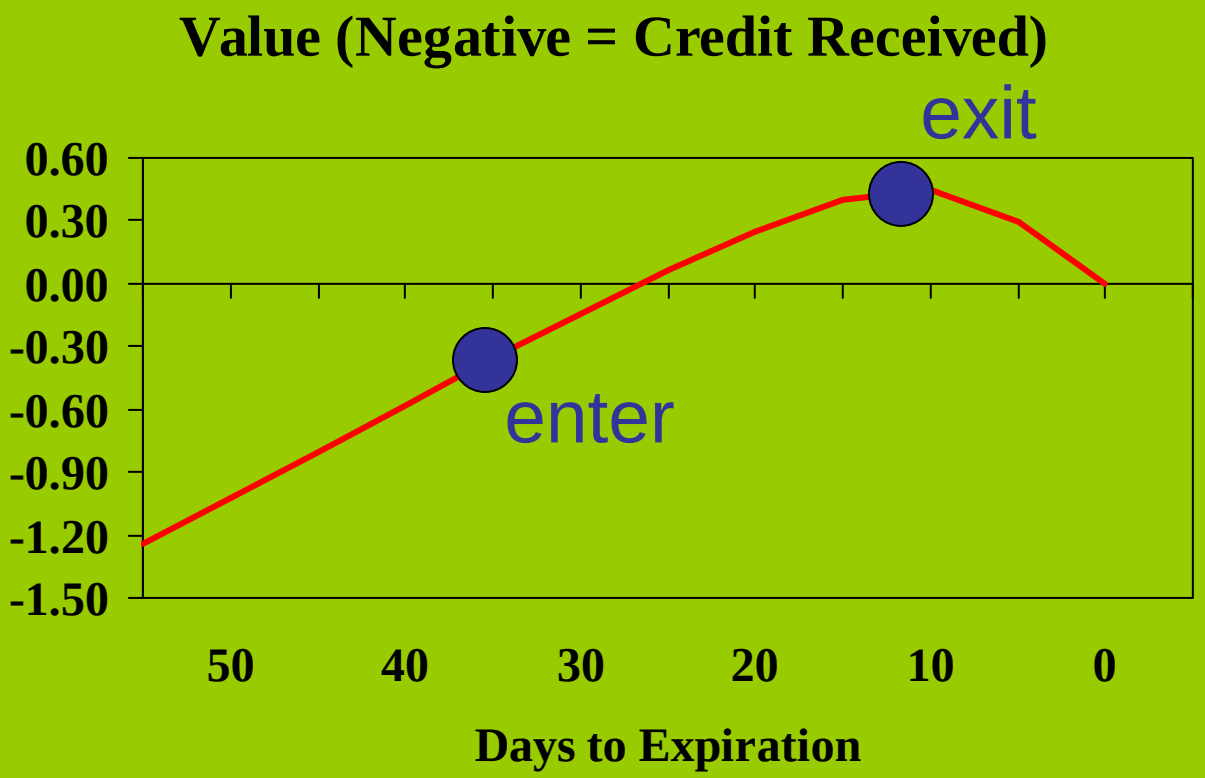
Margin = 20% of short strike

Return = net credit / margin x days per / days to exp

= .20 x 1,000 = $200

= 35 / 2,200 x 365 / 35 = .0016 = 16%

Ratio Spreads and Time



Underlying, 100; volatility, 40%; int rate, 1.20%; no div.

Ratio Spds & Time – Observations

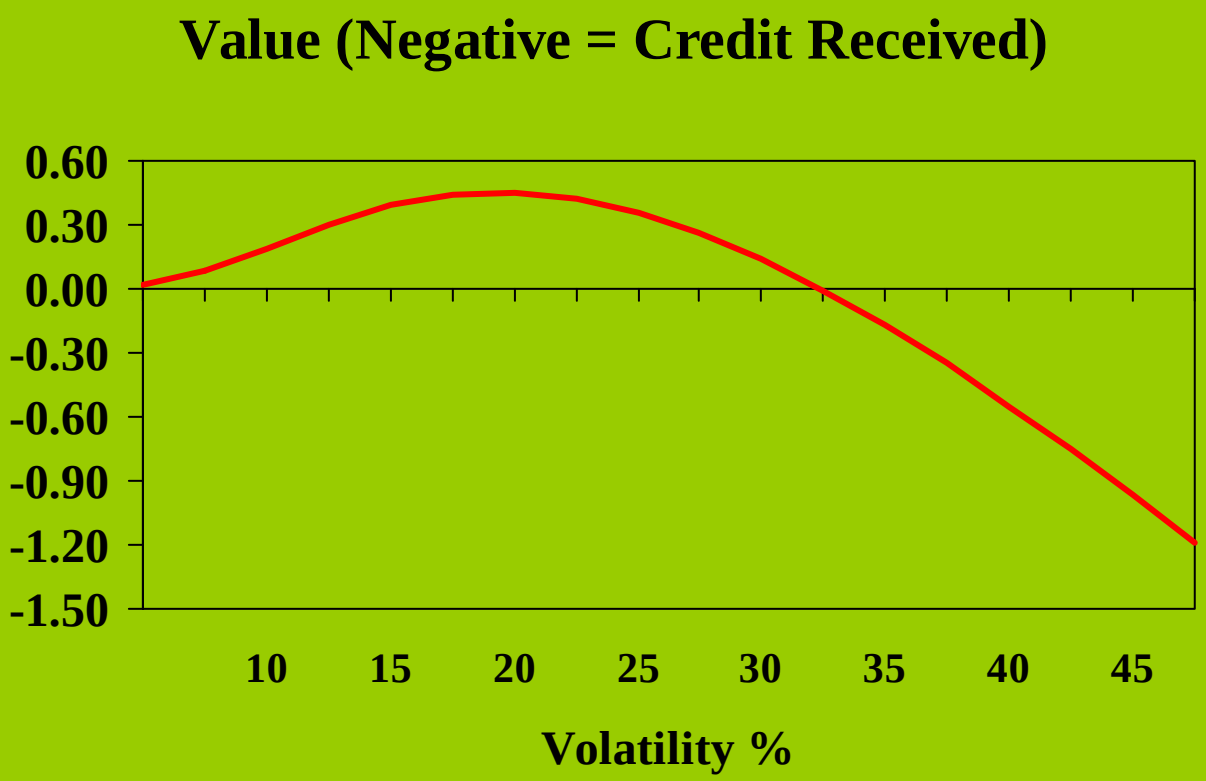
The value of a ratio spread changes from a credit prior to 35 days before expiration to a debit at 10 days and then to zero.

The lower the volatility, the sooner (more time to expiration) the value becomes a debit.

Goal: establish for a credit prior to 35 days & close for another credit at two weeks to 10 days prior to expiration.

To “make money” requires time.

Ratio Spread and Volatility



Underlying, 100; volatility, 40%; int rate, 1.20%; no div.

Ratio Spds & Vol. – Observations

The higher the implied volatility, the larger the credit received for establishing a ratio spread.

At “low” levels of volatility, ratio spreads are established for a net debit.

Ratio spreads work best when volatility is declining.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Ratio Spreads
Managing Positions

Ratio Spds – Managing Alternatives

Close the position.

Buy back (cover) one of the short options; create one vertical spread.

Buy one more of the long options; create two vertical spreads.

Roll the two short options to a further-away strike; extend the range of profitability and the break-even point.

Ratio Spds – Close the Position

Closing a ratio spread may result in a profit or a loss, depending the underlying price, the time to expiration and the level of implied volatility.

A position should be closed when:

- the profit target is achieved.
- the pre-determined maximum loss is reached.
- the market outlook is extremely uncertain and increasing losses are feared.

Ratio Spds – Managing Alternatives

Buy back (cover) one of the short options;
create one vertical spread.

Ratio Spd: Buy One Short Option

Stock 100
Days 35

Orig. position:

+1	105 Call	2.99	Net Credit
–2	110 Call	1.67 ea.	0.35

Stock 112
Days 10

Action:

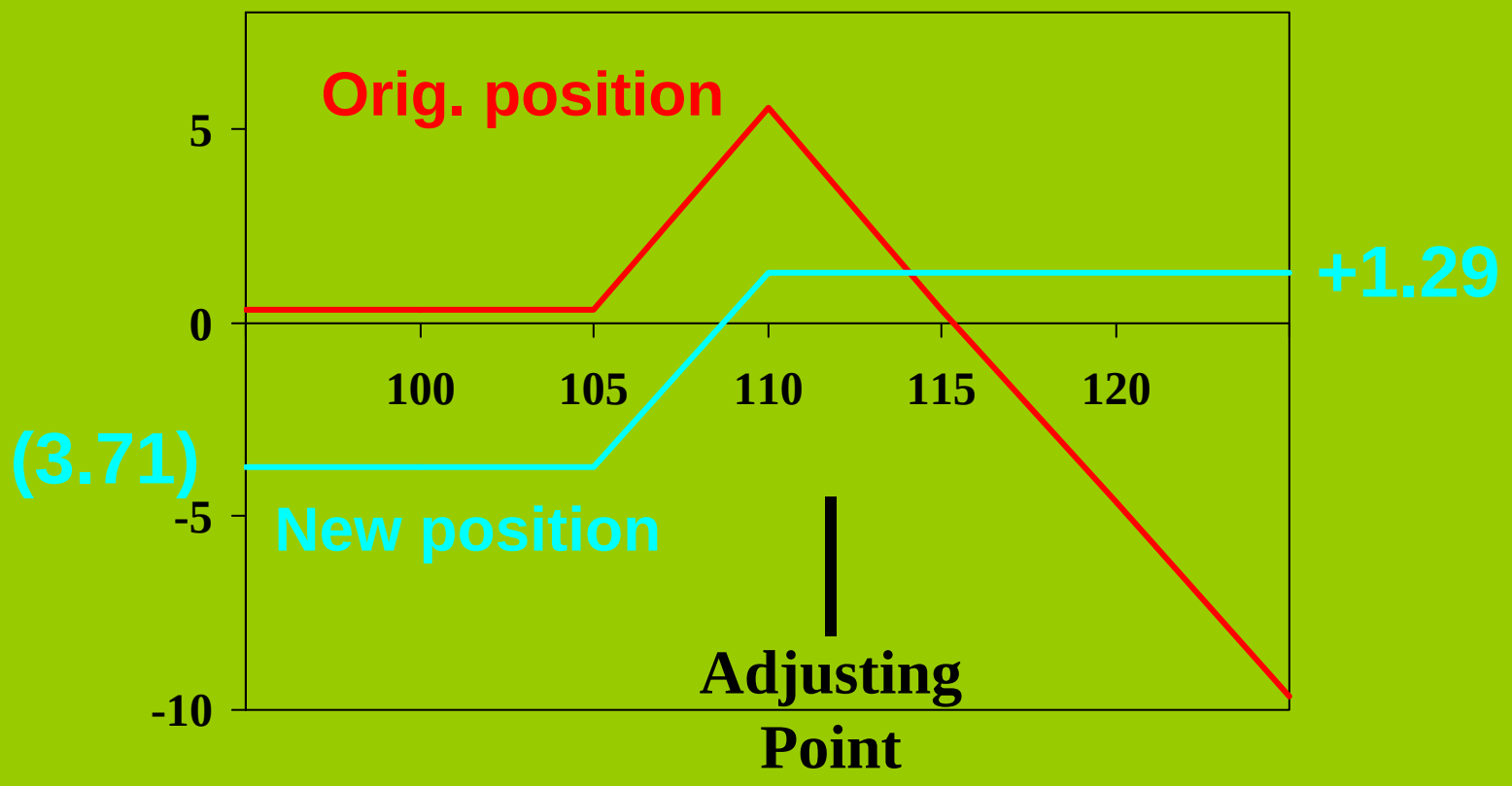
+1	110 Call	4.06	Debit (4.06)

New Position:

+1	105 Call		Net Debit
–1	110 Call		(3.71)

< 105 max risk = (3.71) > 110 max profit = +1.29

Ratio Spread → Vertical Spread



Ratio Spds – Managing Alternatives

Buy one more of the long options; create two vertical spreads.

Ratio Spd: Buy One More Long Opt.

Stock 100
Days 35

Orig. position:

+1	105 Call	2.99	Net Credit
–2	110 Call	1.67 ea.	0.35

Stock 112
Days 10

Action:

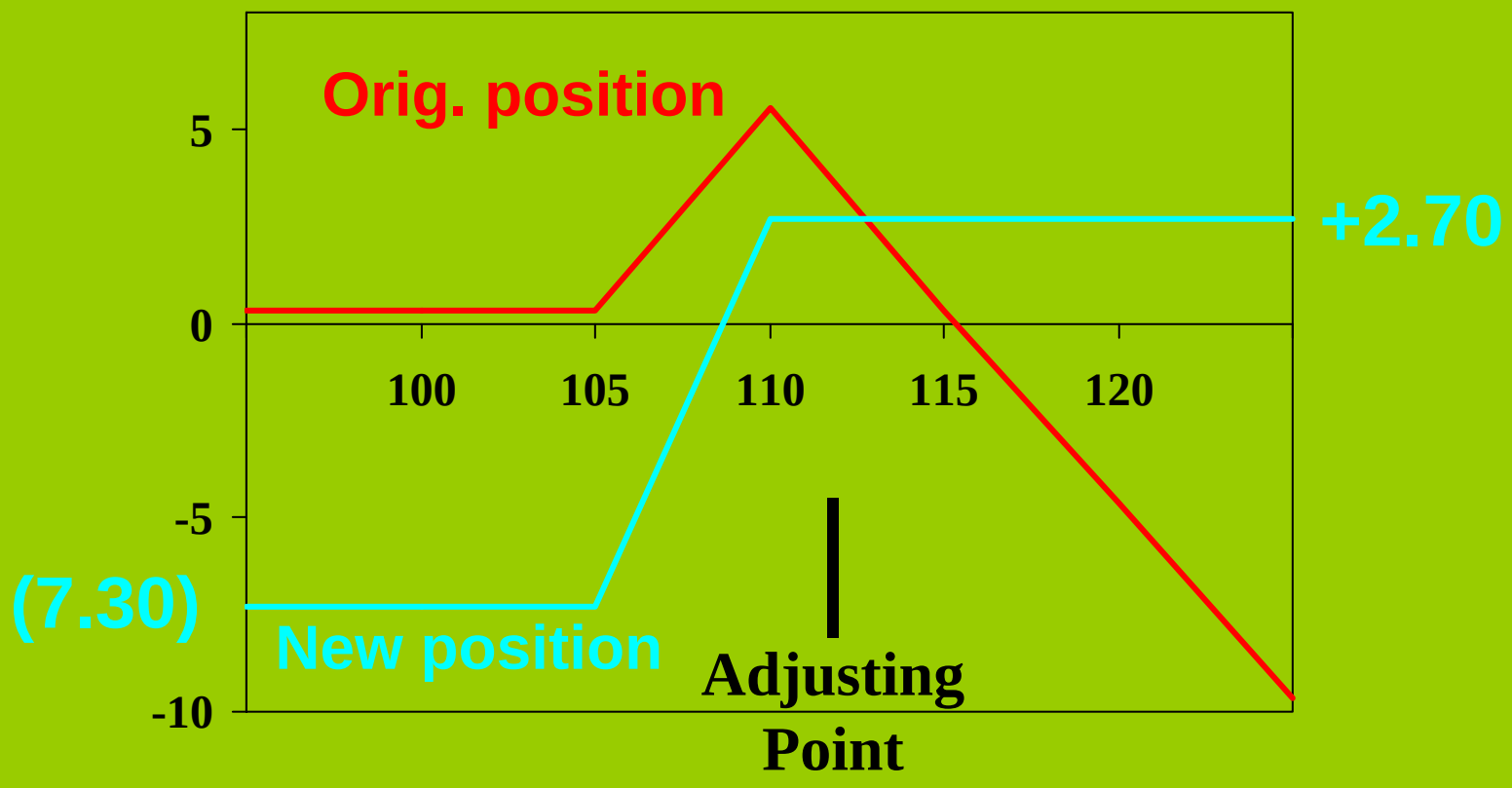
+1	105 Call	7.65	Debit (7.65)

New Position:

+2	105 Call		Net Debit
–2	110 Call		(7.30)

< 105 max risk = (7.30) > 110 max profit = +2.70

Ratio Spread → 2 Vertical Spreads



Ratio Spds – Managing Alternatives

Roll the two short options to a further-away strike; extend the range of profitability and the break-even point.

Ratio Spd: Roll Short Options

Stock 100
Days 35

Orig. position:

+1	105 Call	2.99	Net Credit
–2	110 Call	1.67 ea.	0.35

Stock 112
Days 10

Action:

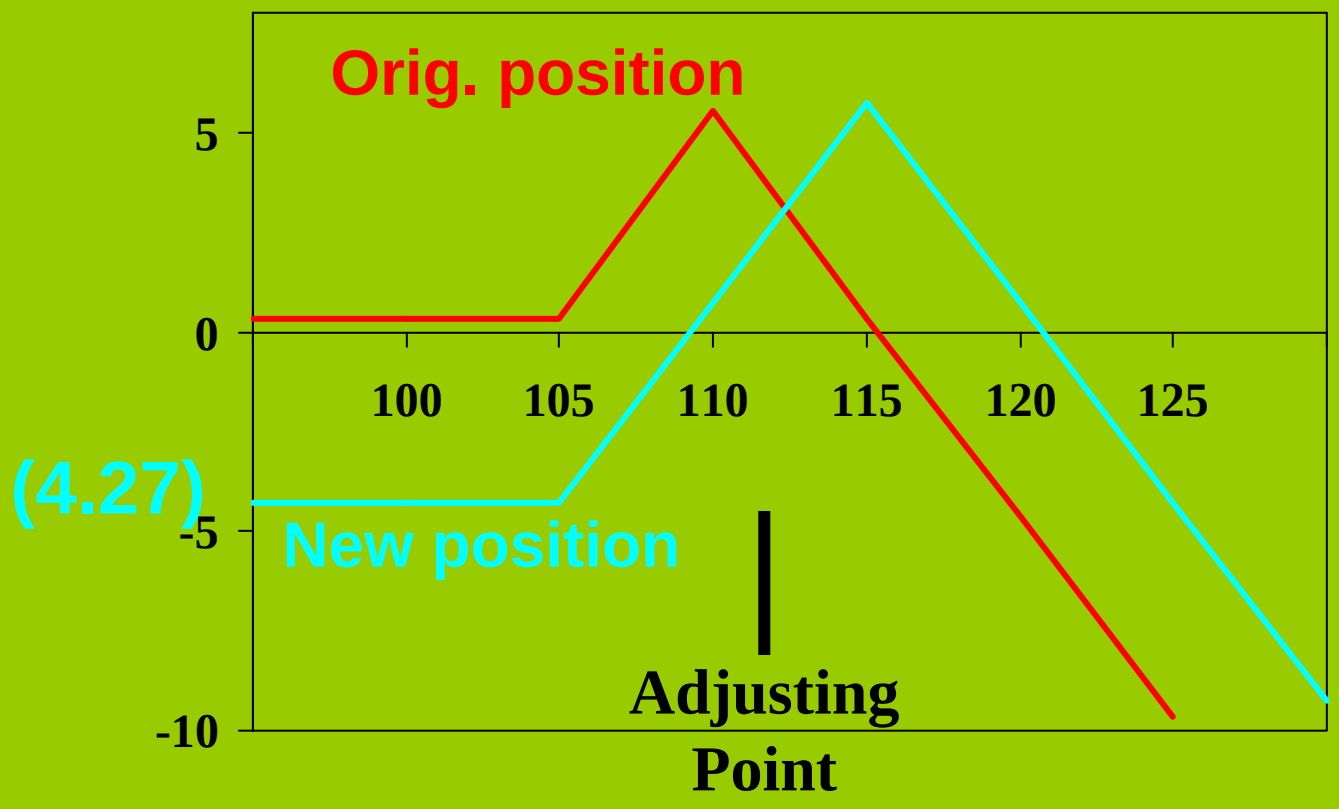
+2	110 Call	4.06 ea.	Net Debit
–2	115 Call	1.75 ea.	(4.62) tot

New Position:

+1	105 Call		Net Debit
–2	115 Call		(4.27) tot

New B-E: 109.27 & 120.73

Ratio Spread → New Ratio Spread

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Ratio Spreads & Volatility

Converting the 1-Year Std. Dev.

Index Level	100.00
Days to Exp	35
Implied Volatility	40%

$$\frac{\text{Stock Price} \times \text{I.V.} \times \sqrt{\text{Days to Exp}}}{\sqrt{\text{Days per year}}}$$

$$\frac{100.00 \times .40 \times \sqrt{35}}{\sqrt{365}} = \mathbf{12.40}$$

Ratio Spreads – Price Relationships

Volatility	30%	40%	50%
1 Std Dev	9.30	12.40	15.50
100 Call	3.76	4.99	6.22
105 Call	1.84	2.99	4.18
110 Call	0.79	1.67	2.70
115 Call	0.30	0.88	1.68

Long strike 5% below Stock Price to 1 Std Dev credit 0.66

Short strike 1 Std Dev below Stock Price

Underlying Price: 100; Days to Exp.: 35

Spread Greeks

30%	Value	Δ	g	v	t
+1 105 C	1.84	+.32	+.039	+.11	–.35
–2 110 C	0.79	–.17	–.027	–.08	+.23
	(.26)	–.02	–.015	–.05	+.11
40%					
+1 105 C	2.99	+.37	+.031	+.12	–.50
–2 110 C	1.67	–.24	–.025	–.10	+.40
	.35	–.09	–.019	–.08	+.30
50%					
+1 110 C	2.70	+.30	+.022	+.11	–.56
–2 115 C	1.68	–.21	–.018	–.09	+.45
	.66	–.11	–.014	–.07	+.34

Real World Prices & Issues

Creating Ratio Spreads in Today's Market

XYZ @ 96.15 (40 days to exp.)

Ratio spread with puts? Stock stays above 75?

Ratio Spread – Example

XYZ @ 96.16 40 days to expiration

	Bid		Ask	I.V.
90 Put	5.20	–	5.40	64%
85 Put	3.60	–	3.70	66%
80 Put	2.40	–	2.50	69%
75 Put	1.55	+	1.65	71%

1.60

+1 80 Put @ 2.50

-2 75 Puts @ 1.60 ea.

Net 0.70 Cr

$$1 \text{ Std Dev} = \frac{96.15 \times .66 \times \sqrt{40}}{\sqrt{365}} \approx 21$$

Ratio Spread – Example

+1	40-day 80 Put	2.50	(2.50)
–2	40-day 75 Put	1.60 ea.	3.70
		Net:	0.70 Credit

Margin requirement: **$1,920**

Annualized return if all options expire worthless **≈ 33%**

Margin = 20% of stock price

= .20 × 96 × 100 = $1,920

Return = credit / margin × days per / days to exp

= 70 / $1,920 × 365 / 40 = 0.33 = 33%

Analyzing the Spread

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SPREAD POSITIONS

	Option 1	Option 2	Option 3	Option 4
IsIndex	☑	☑	☑	☑
IsEuropean	☑	☑	☑	☑
Quantity	0	0	1	-2
Type	Put	Put	Put	Put
Stock Price*	96.00	96.00	96.00	96.00
Strike Price	90.00	85.00	80.00	75.00
Volatility %	65.24	67.28	70.45	72.79
Interest %	1.20	1.20	1.20	1.20
Dividend	0.00	0.00	0.00	0.00
Ex-Div Days	0	0	0	0
Expiry Days*	40	40	40	40
Multiplier	1	1	1	1
Value	5.30	3.65	2.50	1.60
Delta	-0.34	-0.25	-0.18	-0.12

SPREAD GREEKS

	Total
Value	-0.70
Delta	0.07
Gamma	-0.01
Vega	-0.05
Theta	0.30
Rho	0.01

Decimal Places 2

PRICE +1 | DAYS +1

PRICE -1 | DAYS -1

Ratio Spd – Values over Time & Price

Theo Price	40 days	36 days	32 days	28 days	24 days	20 days	16 days	12 days	8 days	4 days
100	-0.46	-0.31	-0.18	-0.06	0.04	0.10	0.13	0.12	0.06	0.01
96	-0.70	-0.51	-0.34	-0.17	-0.03	0.09	0.16	0.18	0.13	0.02
92	-1.05	-0.82	-0.59	-0.37	-0.16	0.02	0.17	0.26	0.24	0.09
88	-1.53	-1.25	-0.97	-0.69	-0.42	-0.15	0.10	0.30	0.40	0.28
84	-2.19	-1.87	-1.54	-1.20	-0.85	-0.49	-0.12	0.23	0.54	0.64
80	-3.07	-2.72	-2.34	-1.95	-1.53	-1.08	-0.60	-0.07	0.49	1.07
76	-4.23	-3.85	-3.44	-3.01	-2.54	-2.03	-1.46	-0.80	-0.01	1.08
72	-5.70	-5.31	-4.90	-4.46	-3.97	-3.44	-2.84	-2.14	-1.27	-0.04
68	-7.53	-7.16	-6.77	-6.34	-5.89	-5.39	-4.83	-4.20	-3.45	-2.57
64	-9.75	-9.42	-9.07	-8.70	-8.31	-7.89	-7.45	-6.98	-6.50	-6.09

Ratio Spread – Example

XYZ @ 88.00 36 days to expiration

		I.V.	
90 Put	9.32	75%	(was 5.30)
85 Put	6.97	78%	(was 3.65)
80 Put	5.05	81%	(was 2.50)
75 Put	3.54	84%	(was 1.60)
70 Put	2.24	85%	(was 0.85)

Was:
0.70 Cr

Now:
+1
–2
2.00 Cr

Stock down 8.00 in 4 days

Buy 1 80 Put (create 2 put spds)

Stock 88 at 36 days

+1 80 P (2.50)	+1 80 P (5.05)	+2 80 P (3.78) ea
–2 75 P 1.60 ea		–2 75 P 1.60 ea
Net Cr 0.70		= Net Dr (2.18) ea
	(5.05)	Net Dr (4.36) tot

B-E = 80.00 – 2.18 = 77.82

Max Profit = (5.00 – 2.18) x 2 = 5.64

Max Risk = (2.18) x 2 = (4.36)

Buy 1 75 Put (create 1 put spd)

Stock 88 at 36 days

+1 80 P (2.50)		+1 80 P (2.50)
–2 75 P 1.60 ea	+1 75 P (3.55)	–1 75 P (0.35)
Net Cr 0.70	(3.55)	= Net Dr (2.85)

B-E = 80.00 – 2.85 = 77.15

Max Profit = 5.00 – 2.85 = 2.15

Max Risk = (2.85)

Roll 75 Puts to 70 Strike

Stock 88 at 36 days

+1 80 P (2.50)		+1 80 P (2.50)
–2 75 P 1.60 ea	+2 75 P (3.55)	
	–2 70 P 2.25	–2 70 P (0.30) ea
Net Cr 0.70	Net Dr (2.60)	= Net Dr (1.90) tot

B-E = 80.00 – 1.90 = 78.10 & 60.00 + 1.90 = 61.90

Max Profit = 8.10 (@ 70.00)

Max Risk = Long Stock @ 61.90

Net investment now = 1.90 & 80 Put = 5.05

Conclusions – Ratio Spreads

- In “high-volatility” markets, ratio spreads are an alternative to covered calls and short puts
- Nearly zero delta, gamma, vega, theta
- Plan short strike to be at or beyond one standard deviation (calculated from imp. vol.)
- 3 managing alternatives – plus variations
- Determine your adjusting points in advance
- “Whipsaw” price action is always bad!

THANK YOU FOR ATTENDING.

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