

LECTURE 3

Chapter 7 – Advanced Option Strategies

STRADDLE (Chapter 7, page 260)

A long straddle is established by BUYING A CALL and A PUT on a stock each with the same X price and same Expiration Date. The view is Volatility – If the investor is expecting that the stock will swing significantly up or significantly down based on news (FDA drug, Court Decision, etc). – Volatility Bet

The worst case scenario for straddle is no movement in the stock – max loss is the premium on both PUT and CALLS

	$St \leq X$	$St > X$
Payoff of CALL	0	$St - X$
Payoff of PUT	$(X - St)$	+0
Total	$X - St$	$St - X$

Example

Suppose the investor is holding a large position of DCRB. –
Current Price = \$125.94

COLLARS (Chapter 7, page 247)

A collar is an option strategy that brackets the value of the portfolio between two bounds

Example

Suppose the investor is holding a large position of DCRB. –
Current Price = \$125.94

A lower bound of \$120 can be place or the value of the portfolio by buying protection put with $X = \$120$ – pay the July premium of \$13.65 To raise money to pay for the premium the investor rights a CALL at \$130 – receives a Premium of \$16.40 . Collars usually built so that the premium nets out, so using this example since the upside to \$130 is \$16.40, a broker could price the exercise price at \$135 that yields the same premium as the Put (\$13.65).

INTRODUCTION TO DERIVATIVES

Prof. C. Droussiotis

A typical Collar has \$0 premium – basically giving the upside to protect the down side – a basic combination of Protective Put and Covered Call as long as you own the stock.

SPREADS (Chapter 7, page 239)

A spread is the purchase of one option and the sale of another. There are two general types of spreads:

Money Spread (Vertical): Purchase and sell of options at different X prices
Example (June 120/125): Purchase option of \$120 in June and sell an option of \$125 in June

Time Spread (Horizontal): Purchases and sell of options at different Expiration Times
Example (June/July \$120): Purchase a June at \$120 and sell a July at \$120

	$St \leq X1$	$X1 < St < X2$	$St > X2$
Payoff of CALL X1	0	$St - X1$	$St - X1$
Payoff of CALL X2	-0	-0	$-(St - X2)$
Total	0	$Sr - X1$	$X2 - X1$

Spreads are used for small profit while limiting the risk. Risk reduction is achieved by being long in one option and short in another. If the stock price decreases, the loss on a long call will be somewhat offset by the gain on a short call. Whether the gain outweighs the loss depends on the volatility of each call.

i.e. **Bull Spreads**: The spread involving the purchase of the low-exercise-price call
Bear Spreads: Long the high exercise price and short the low exercise price

Example:

DCRB OPTION DATA MAY 14

Exercise Price	CALLS			PUTS		
	May	June	July	May	June	July
120	8.75	15.40	12.90	2.75	9.25	13.65
125	5.75	13.50	18.60	4.60	11.50	16.60
130	3.60					

INTRODUCTION TO DERIVATIVES

Prof. C. Droussiotis

		11.35	16.40	7.35	14.25	19.65
Risk Free Rates	0.0447	0.0446	0.0453	0.0447	0.0446	0.0453
Current Stock Price	125.94					

Bull Spreads Example:

June 125/130 with CALL premiums \$13.50 and \$11.35 respectively.

Maximum Loss is the net spread $\$13.50 - \$11.35 = \$2.15$ or $\$2.15 \times 100 = \215 if the stock is below \$125

Maximum Gain is the maximum in strike prices minus the difference in premiums $(130 - 125 - 2.15) = \$2.85$ or $100 \times \$2.85 = \285 which occurs at any stock price at expiration above \$130.

Break Even is where Profit=0 or Profit = $St - X1 - C1 + C2 = 0$ then solve for $St = X1 + C1 - C2$ or $\$125 + 13.50 - 11.35 = \127.15

BULL SPREADS

Date	June	
Type	CALLS	
Shares	100	
Action	Purchase	Sell
Exercise Price	125.00	130.00
Premiums	13.50	11.35

	Spread	\$ amount	% Ch	Stock
Max Loss	2.15	\$ 215.00	-100%	125.00 <
Max Gain	2.85	\$ 285.00	32.56%	130.00 >
BreakEven		\$ -	0%	127.15 =

Bear Spreads Example:

June 125/130 with PUT premiums \$11.50 and \$14.25 respectively.

Maximum Loss is the net spread $\$14.25 - \$11.50 = \$2.75$ or $\$2.75 \times 100 = \275 if the stock is above \$130

INTRODUCTION TO DERIVATIVES

Prof. C. Droussiotis

Maximum Gain is the maximum in strike prices minus the difference in premiums $(130-125+2.75)=\$2.25$ or $100 \times \$2.25 = \225 which occurs at any stock price at expiration below \$125.

Break Even is where Profit=0 or Profit = $P1 + X2 - St - P2 = 0$ then solve for $St = P1 + X2 - P2$ or $\$130 + 11.50 - 14.25 = \127.25

BEAR SPREADS

Date	June	
Type	PUTS	
Shares	100	
Action	Purchase	Sell
Exercise Price	125.00	130.00
Premiums	11.50	14.25

	Spread	\$ amount	% Ch	Stock
Max Loss	2.75	\$ 275.00		130.00 >
Max Gain	2.25	\$ 225.00		125.00 <
BreakEven		\$ -		127.25 =

BUTTERFLY SPREADS (Chapter 7, page 250)

A butterfly spread is a combination of a bull spread and bear spread. The transaction involves three strike prices ($x1$, $x2$ and $x3$) where $x2$ is half way between $x1$ and $x3$.

Example:

Consider the June 120, 125 and 130 calls. In this example, a plot of the results would reveal that the butterfly spread would profit at any stock price. When you look at the prices from the table above we can see that the cost of buying the butterfly spread is less than the lowest possible value of the spread expiration (\$15.40 call premium). Therefore one of the options are mispriced, To avoid any confusion about the performance of the butterfly spread, let's theoretically correct one of the prices – assumed we used Black-

INTRODUCTION TO DERIVATIVES

Prof. C. Droussiotis

Scholes (discuss later) and calculated that the premium for the June 120 is \$16.00 instead of \$15.40, thus let's use \$16.00 for our analysis below.

The butterfly spread for June 120, 125 and 130 calls with premiums of \$16.00 (calculated), \$13.50 and \$11.35, respectively

The worst outcome is the net premiums or $-16.00 + 2(13.50) - 11.35 = -0.35$ or $-0.35 * 100$ shares = -\$35. This is obtained for any stock price less than \$120 or greater than \$130.

The maximum profit is obtained when the price at expiration is in the middle exercise price. The maximum profit is $125 - 120 - 16.00 + 2(13.50) - 11.35 = 4.65$ or $\$4.65 \times 100$ shares = \$465

The Lower Break Even is $120 + 16.00 - 2(13.50) + 11.35 = 120.35$ and the Upper Break Even is $2(125) - 120 - 16.00 + 2(13.50) - 11.35 = 129.65$

The butterfly spread strategy assumes that the stock will fluctuate very little – within the range of \$120.35 and \$129.65 – or a downward move of 4.4% and upward move of 2.9%. If it goes above or below this range the loss will be very minimum at \$35.00

BUTTERFLY SPREADS

Date	June		
Type	CALL		
Shares	100		
Action	Purchase	Sell	
Exercise Price	120.00	125.00	130.00
Premiums	15.40	13.50	11.35
Black Scholes Value	16.00	(mispriced)	

	Spread	\$ amount	% Ch	Stock	Stock
Max Loss	(0.35)	\$ (35.00)		120.00 <	130.00 >
Max Gain	4.65	\$ 465.00		125.00 =	
BreakEven – Lower				120.35 =	=
BreakEven – Upper				129.65 =	=

OTHER NOTABLE OPTION LIKE SECURITIES

- Callable Bonds (Value of straight Vs Callable bonds)
- Convertible Securities (Value of stock vs Bonds)
- Warrants (attached Debt facilities – option to get equity stake)
- Leveraged Equity and Risky Debt (Assets instead of Equity stake for Debt holders)
- Exotic Options
- Asian Option – depending on Average (instead of final)
- Barrier Options – “down and out” – if the price drops passed the barrier causes the option to cancel even if the stock comes back within the expiration day
- Lookback Options – Based on minimum and maximum price
- Currency Translated Options – fix the exchange rate – when converted in US dollars.