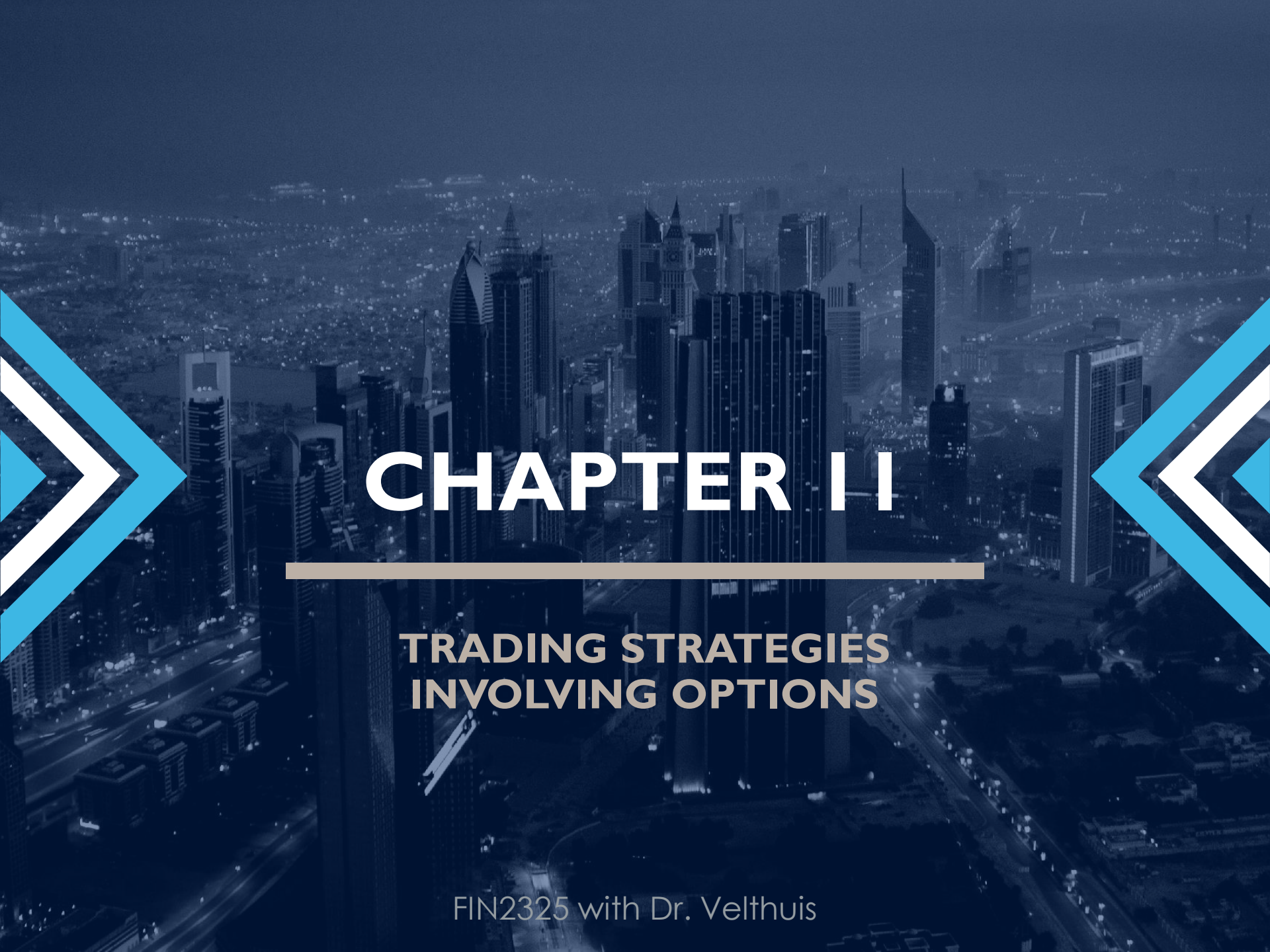


CHAPTER 11

TRADING STRATEGIES INVOLVING OPTIONS

FIN2325 with Dr. Velthuis

Today

- Use options to produce an interesting relationship between profits and stock price

- Obtain any payoff function at T using options and stocks

Building Blocks

- Intuition: Lego
- Building blocks
  - Long or short stocks
  - Long or short calls
  - Long or short puts

Summary

- A trader is of the opinion that a stock will increase in value
  - Willing to take some risk → bull spread strategy
  - Willing to take more risk → long calls

Summary

- A trader believes that there will be a large move in the price of a stock, but does not know the direction of the move (up or down)
  - An aggressive trader may consider a straddle strategy
    - Large gain and large loss
  - A more risk averse trader may consider a reverse butterfly spread
    - Small gain and small loss

Summary

- Put-call parity
  - Long positions in calls can be converted into long positions in puts
  - Short positions in calls can be converted into short positions in puts

Trading Strategies

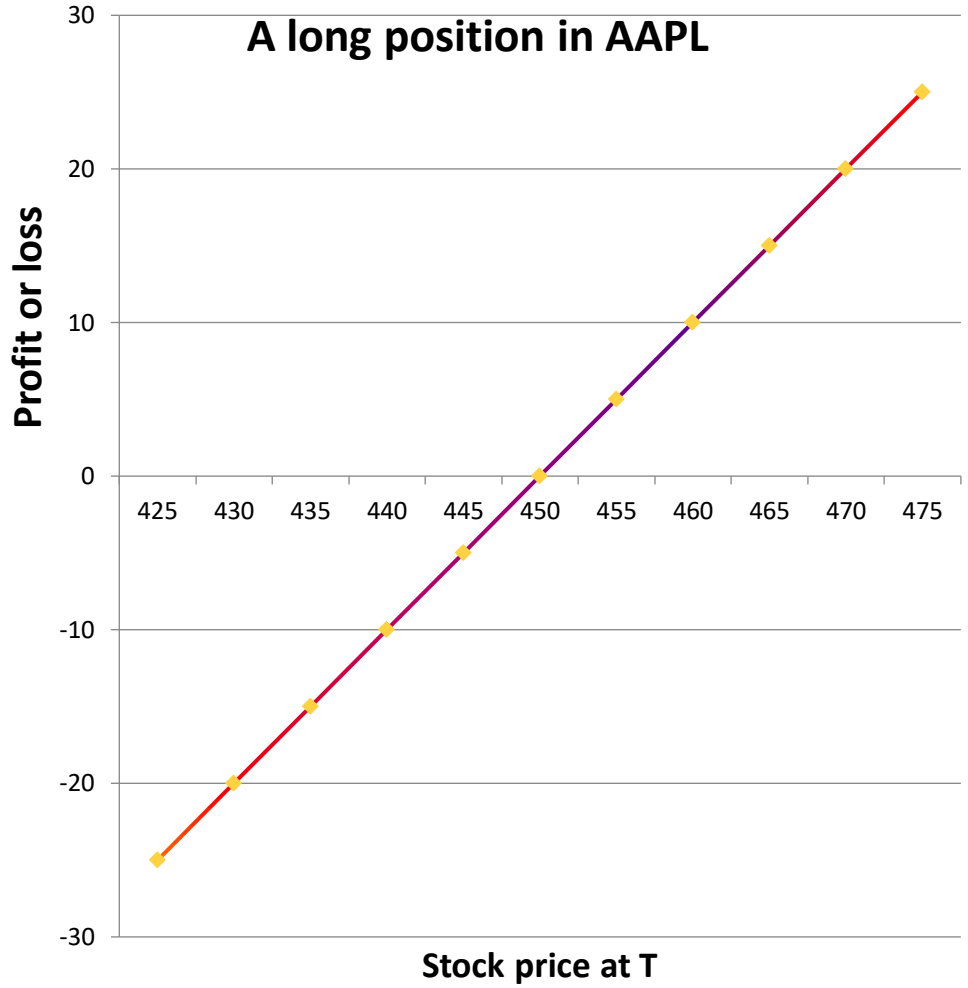
- Take positions in:
  - The option and the underlying asset
  - Two or more options of the same type: *spread*
  - A mixture of calls and puts: *combination*

BUILDING BLOCKS: A LONG POSITION IN STOCK

1. A long position in Apple			
5/31/2013			
S = $450			
		Stock	Stock
Stock Price at T		purchase price	Profit/loss
425		450	-25
430		450	-20
435		450	-15
440		450	-10
445		450	-5
450		450	0
455		450	5
460		450	10
465		450	15
470		450	20
475		450	25

BUILDING BLOCKS: A LONG POSITION IN STOCK

Payoff = S_T
Profit = $S_T - S_0$



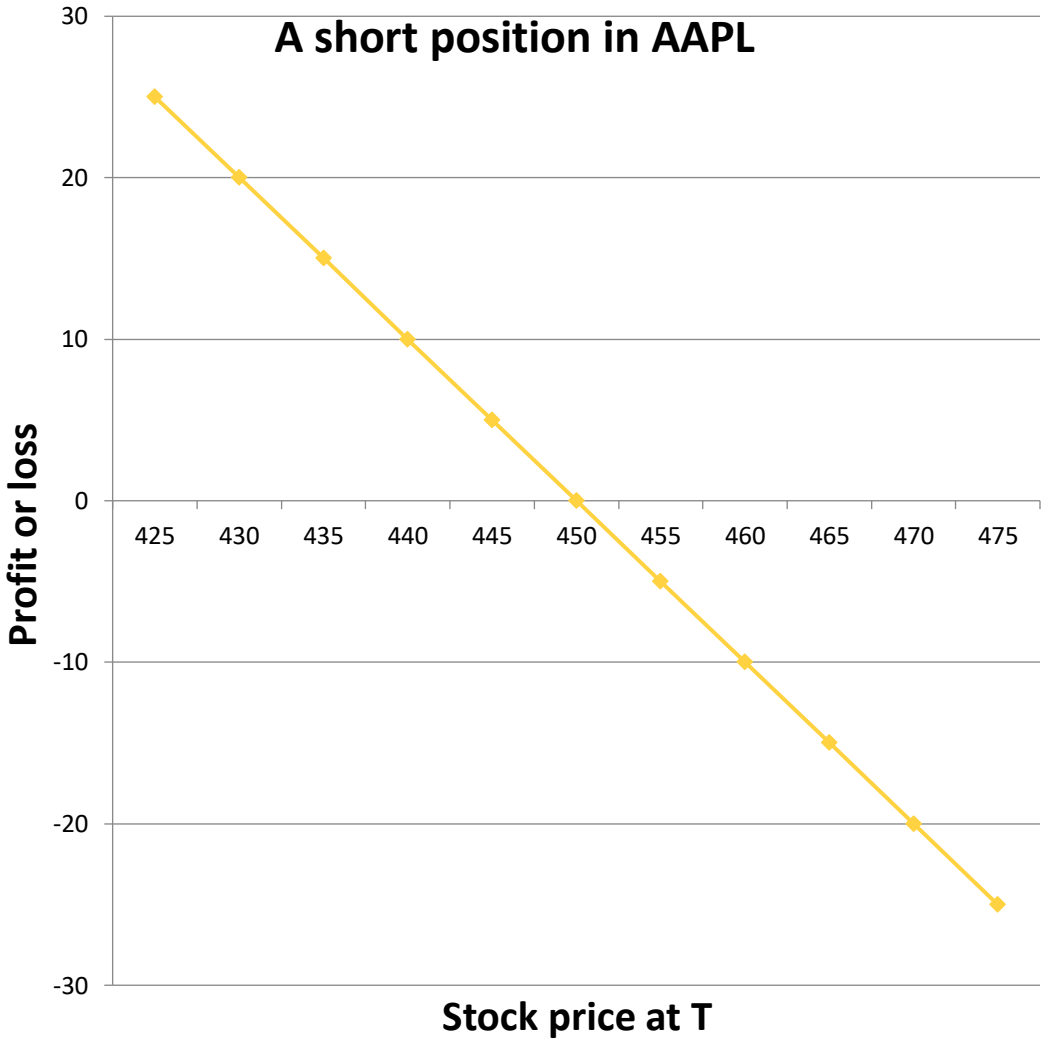
BUILDING BLOCKS: A SHORT POSITION IN STOCK

2. A short position in Apple			
5/31/2013			
S = $450			
		Short Stock	Stock
Stock Price at T		at $400	Profit/loss
425		450	25
430		450	20
435		450	15
440		450	10
445		450	5
450		450	0
455		450	-5
460		450	-10
465		450	-15
470		450	-20

BUILDING BLOCKS: A SHORT POSITION IN STOCK

Payoff = $-S_T$

Profit = $-(S_T - S_0)$

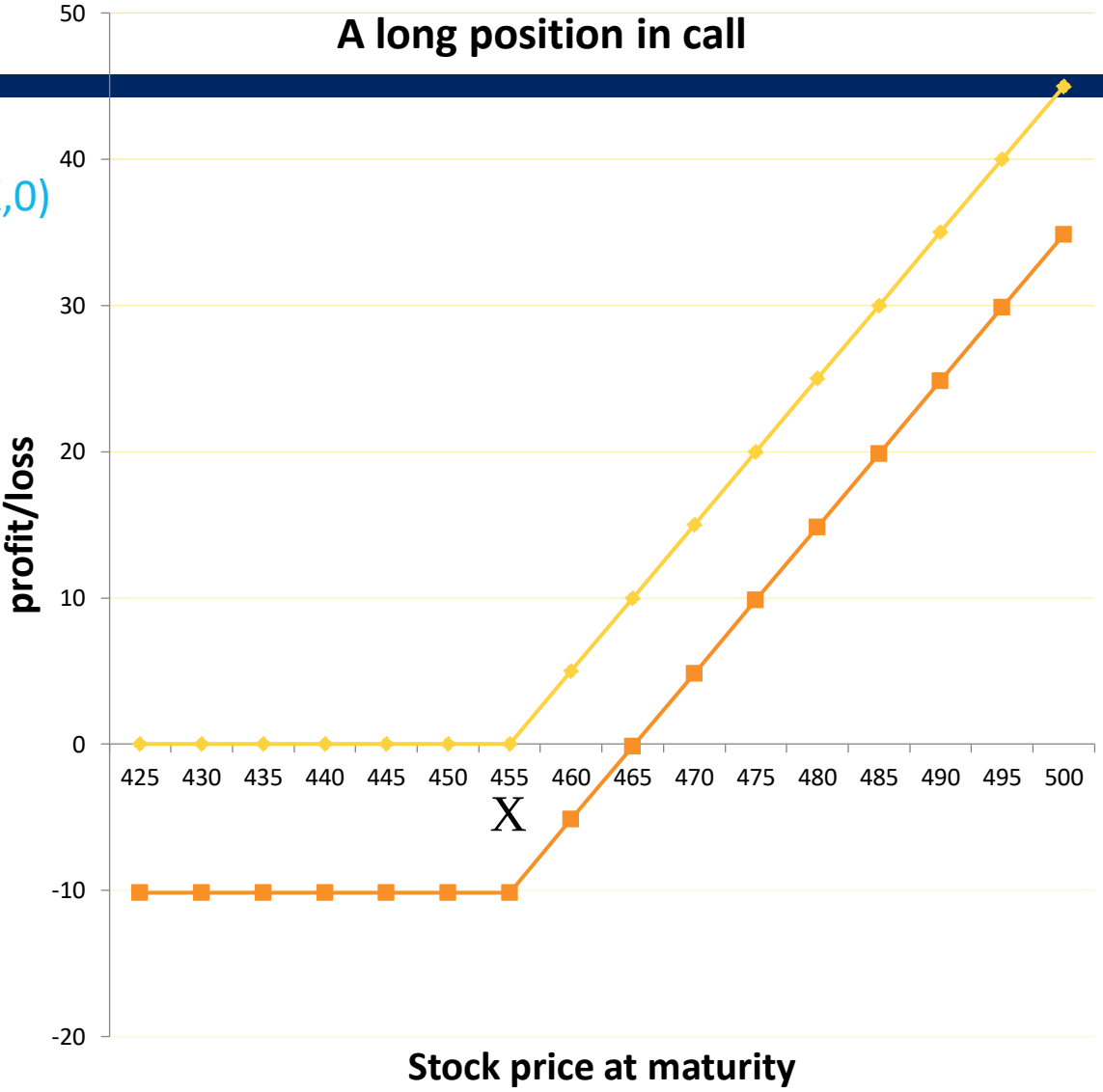


BUILDING BLOCKS: A LONG POSITION IN CALL

3. A long position in call			
5/31/2013			
Current stock price	Strike	Premium	Matutity
450	455	10.15	T (6/21/2013)
		Call Option	
Stock price at maturity	strike	Payoff	Profit/loss
425	455	0	-10.15
430	455	0	-10.15
435	455	0	-10.15
440	455	0	-10.15
445	455	0	-10.15
450	455	0	-10.15
455	455	0	-10.15
460	455	5	-5.15
465	455	10	-0.15
470	455	15	4.85
475	455	20	9.85
480	455	25	14.85
485	455	30	19.85
490	455	35	24.85

BUILDING BLOCKS: A LONG POSITION IN CALL

Payoff = max(S_T-K,0)
Profit = Payoff - C



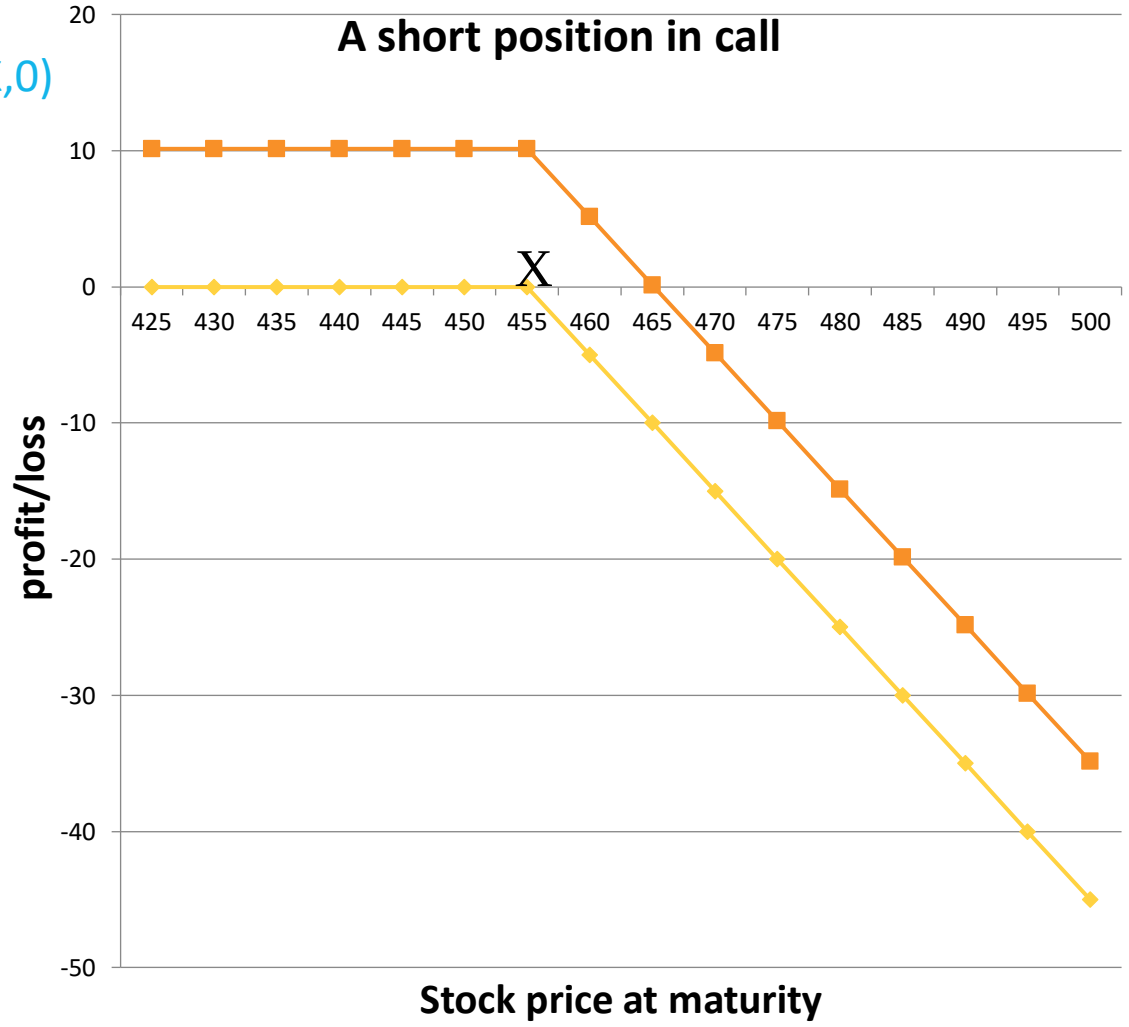
BUILDING BLOCKS: A SHORT POSITION IN CALL

4. A short position in call			
5/31/2013			
Current stock price	Strike	Premium	Maturity
450	455	10.15	T (6/21/2013)
		Call Option	
Stock price at maturity	strike	Payoff	Profit/loss
425	455	0	10.15
430	455	0	10.15
435	455	0	10.15
440	455	0	10.15
445	455	0	10.15
450	455	0	10.15
455	455	0	10.15
460	455	-5	5.15
465	455	-10	0.15
470	455	-15	-4.85
475	455	-20	-9.85
480	455	-25	-14.85
485	455	-30	-19.85
490	455	-35	-24.85
495	455	-40	-29.85

BUILDING BLOCKS: A SHORT POSITION IN CALL

Payoff = - max(S_T-K,0)

Profit = Payoff + C

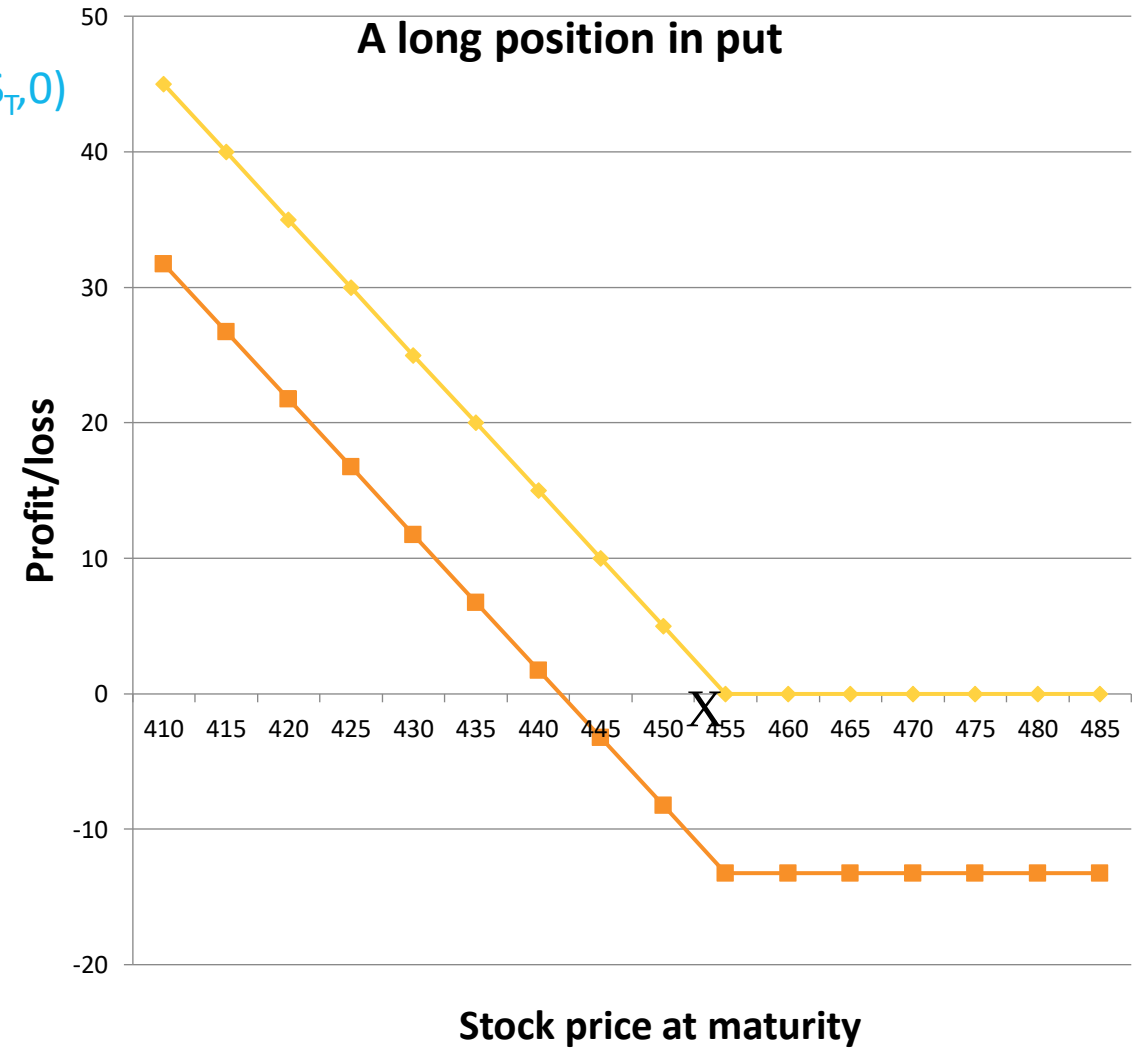


BUILDING BLOCKS: A LONG POSITION IN PUT

5. A long position in put			
5/31/2013			
Current stock price	Strike	Premium	Matutity
450	455	13.25	T (6/21/2013)
		Put Option	
Stock price at maturity	strike	Payoff	Profit/loss
410	455	45	31.75
415	455	40	26.75
420	455	35	21.75
425	455	30	16.75
430	455	25	11.75
435	455	20	6.75
440	455	15	1.75
445	455	10	-3.25
450	455	5	-8.25
455	455	0	-13.25
460	455	0	-13.25
465	455	0	-13.25
470	455	0	-13.25

BUILDING BLOCKS: A LONG POSITION IN PUT

Payoff = max(K – S_T,0)
Profit = Payoff - P



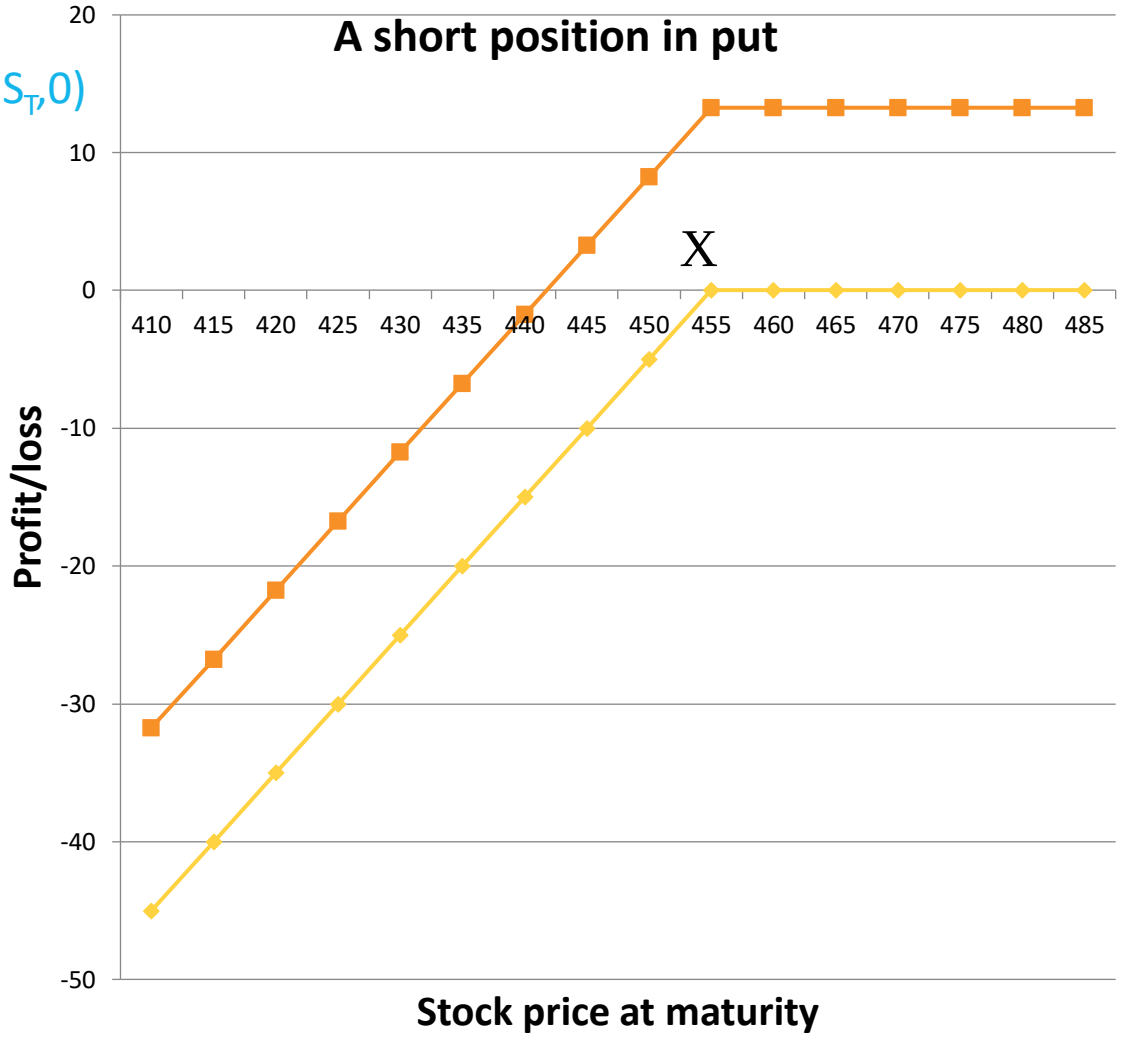
BUILDING BLOCKS:
A SHORT POSITION IN PUT

6. A short position in put			
5/31/2013			
Current stock price	Strike	Premium	Matutity
450	455	13.25	T (6/21/2013)
		Put Option	
Stock price at maturity	strike	Payoff	Profit/loss
410	455	-45	-31.75
415	455	-40	-26.75
420	455	-35	-21.75
425	455	-30	-16.75
430	455	-25	-11.75
435	455	-20	-6.75
440	455	-15	-1.75
445	455	-10	3.25
450	455	-5	8.25
455	455	0	13.25
460	455	0	13.25
465	455	0	13.25
470	455	0	13.25

BUILDING BLOCKS: A SHORT POSITION IN PUT

Payoff = - max(K – S_T,0)

Profit = Payoff + P



Strategies Involving a Single Option and a Stock

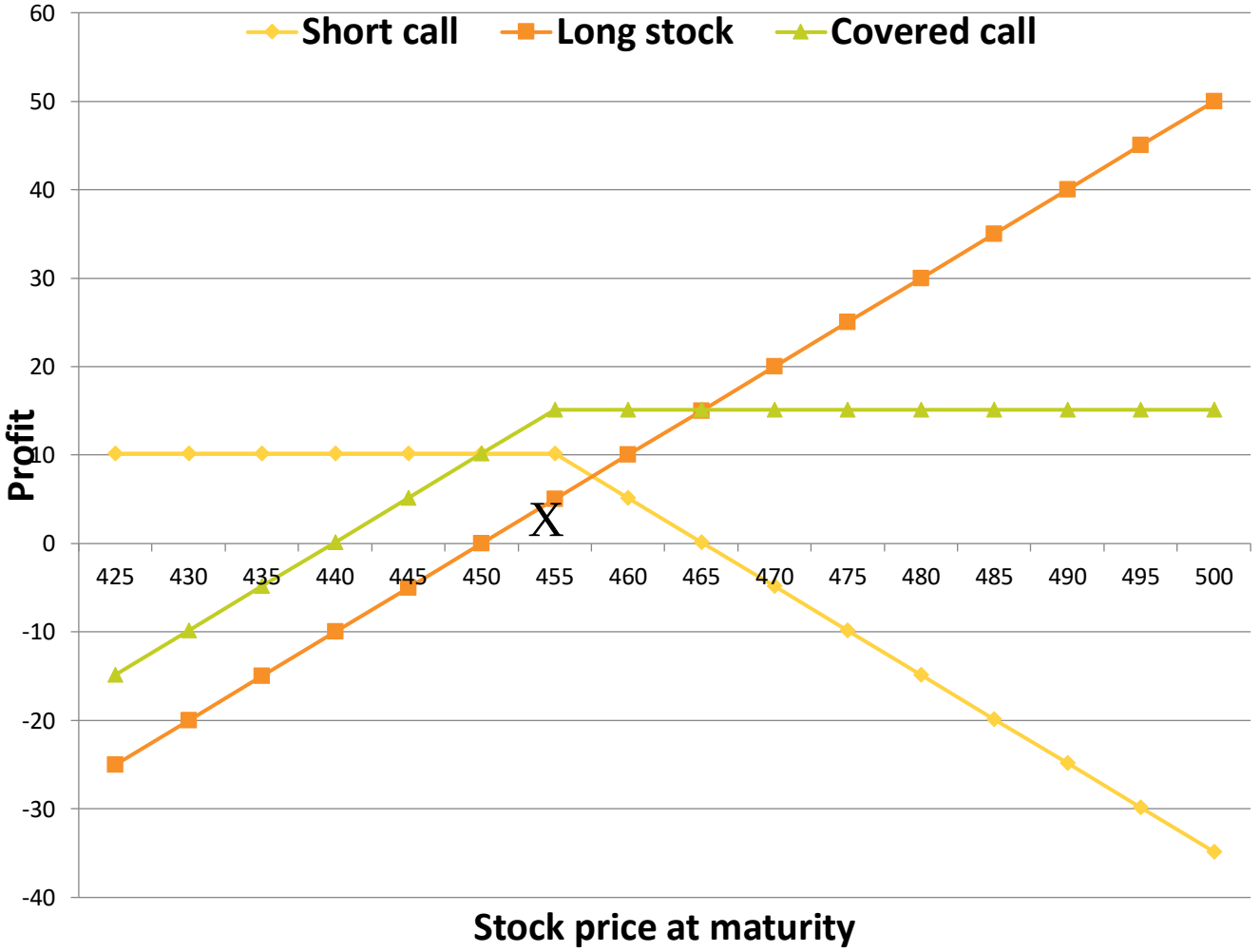
Strategies Involving a Single Option and a Stock

- Writing a covered call
  - A long position in a stock and a short position in a call
  - The long stock position covers the investor from the payoff on the short call

Covered Call

7. Write a covered call: Long a stock and short a call					
5/31/2013					
Current stock price	Strike	Premium	Maturity		
450	455	10.15	T (6/21/2013)		
		Call Option			
Stock price at maturity	strike	Payoff	Profit/loss	Profit/loss	
			Short call	*Long stock*	*Covered call*
425	455	0	10.15	-25	-14.85
430	455	0	10.15	-20	-9.85
435	455	0	10.15	-15	-4.85
440	455	0	10.15	-10	0.15
445	455	0	10.15	-5	5.15
450	455	0	10.15	0	10.15
455	455	0	10.15	5	15.15
460	455	-5	5.15	10	15.15
465	455	-10	0.15	15	15.15
470	455	-15	-4.85	20	15.15
475	455	-20	-9.85	25	15.15
480	455	-25	-14.85	30	15.15
485	455	-30	-19.85	35	15.15
490	455	-35	-24.85	40	15.15
495	455	-40	-29.85	45	15.15
500	455	-45	-34.85	50	15.15

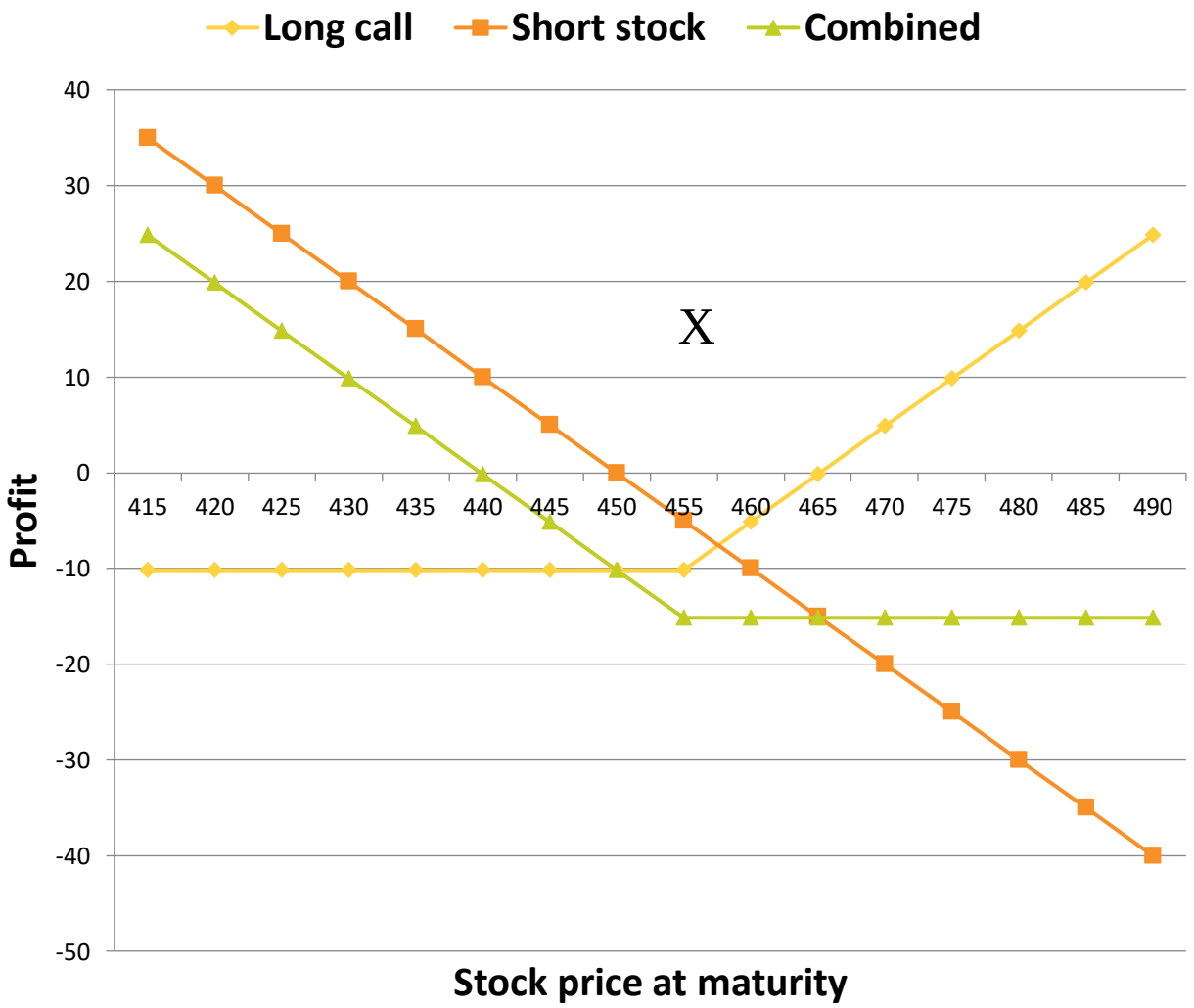
Covered Call



POSITIONS IN AN OPTION & THE UNDERLYING

8. Short stock and Long call					
5/31/2013					
Current stock price	Strike	Premium	Matutity		
450	455	10.15	T (6/21/2013)		
		Long call			
Stock price at maturity	strike	Payoff	Profit	profit	
			Long call	*Short stock*	*Combined*
415	455	0	-10.15	35	24.85
420	455	0	-10.15	30	19.85
425	455	0	-10.15	25	14.85
430	455	0	-10.15	20	9.85
435	455	0	-10.15	15	4.85
440	455	0	-10.15	10	-0.15
445	455	0	-10.15	5	-5.15
450	455	0	-10.15	0	-10.15
455	455	0	-10.15	-5	-15.15
460	455	5	-5.15	-10	-15.15
465	455	10	-0.15	-15	-15.15
470	455	15	4.85	-20	-15.15
475	455	20	9.85	-25	-15.15

POSITIONS IN AN OPTION & THE UNDERLYING



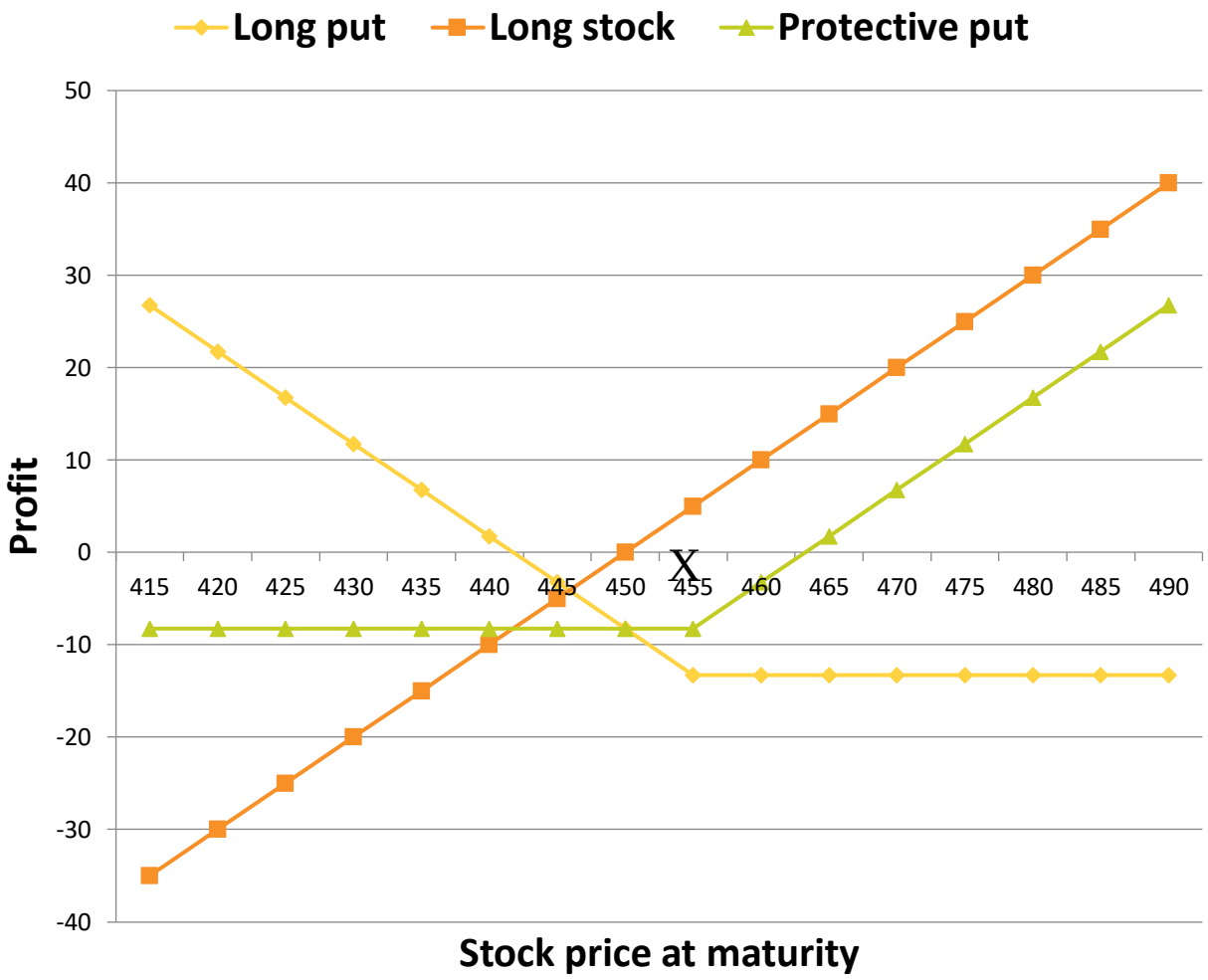
Strategies Involving a Single Option and a Stock

- A protective put
  - A long position in a stock and a long position in a put
  - The long position in the put protects the investor from a sharp decrease in the stock price

PROTECTIVE PUT

9. A protective put Long stock and long put					
5/31/2013					
Current stock price	Strike	Premium	Matutity		
450	455	13.25	T (6/21/2013)		
Stock price at maturity	strike	Payoff	Profit	Profit	
		Long put	Long put	Long stock	Protective put
415	455	40	26.75	-35	-8.25
420	455	35	21.75	-30	-8.25
425	455	30	16.75	-25	-8.25
430	455	25	11.75	-20	-8.25
435	455	20	6.75	-15	-8.25
440	455	15	1.75	-10	-8.25
445	455	10	-3.25	-5	-8.25
450	455	5	-8.25	0	-8.25
455	455	0	-13.25	5	-8.25
460	455	0	-13.25	10	-3.25
465	455	0	-13.25	15	1.75
470	455	0	-13.25	20	6.75
475	455	0	-13.25	25	11.75
480	455	0	-13.25	30	16.75

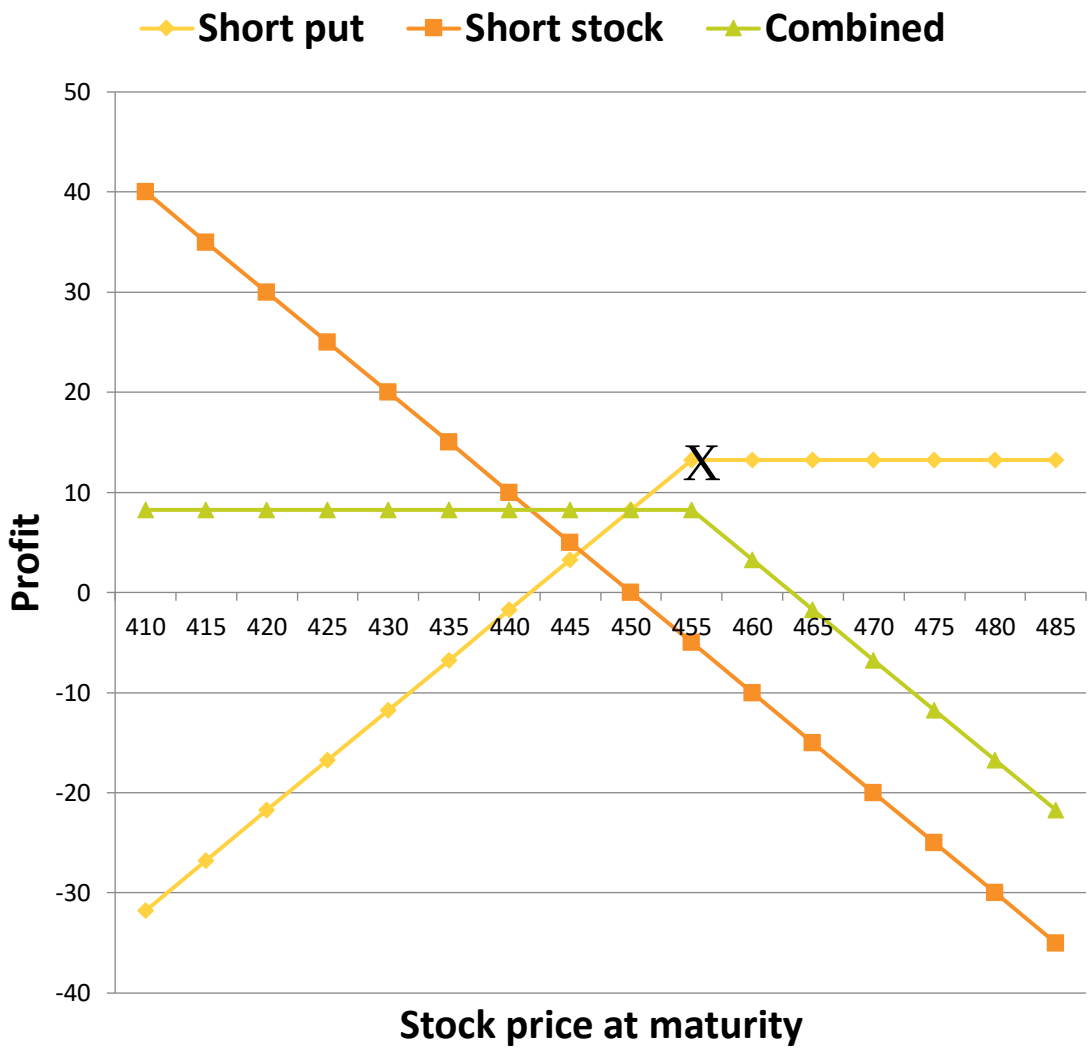
PROTECTIVE PUT



POSITIONS IN AN OPTION & THE UNDERLYING

10. Short stock and short put					
5/31/2013					
Current stock price	Strike	Premium	Matutity		
450	455	13.25	T (6/21/2013)		
		Put Option			
Stock price at maturity	strike	Payoff	Profit/loss	Profit	
			Short put	Short stocl	Combined
410	455	-45	-31.75	40	8.25
415	455	-40	-26.75	35	8.25
420	455	-35	-21.75	30	8.25
425	455	-30	-16.75	25	8.25
430	455	-25	-11.75	20	8.25
435	455	-20	-6.75	15	8.25
440	455	-15	-1.75	10	8.25
445	455	-10	3.25	5	8.25
450	455	-5	8.25	0	8.25
455	455	0	13.25	-5	8.25
460	455	0	13.25	-10	3.25
465	455	0	13.25	-15	-1.75
470	455	0	13.25	-20	-6.75
475	455	0	13.25	-25	-11.75

POSITIONS IN AN OPTION & THE UNDERLYING



Two or More Options of the Same Type – Spread Strategy

Two Options of the Same Type – Spread Strategy

- Bull spreads created from calls
  - An investor expects the stock price will increase
  - Buy a call with a lower strike price and sell a call with a higher strike price
  - Both options have the same expiration date
  - This strategy limits the investor's upside potential and downside risk

Two Options of the Same Type – Spread Strategy

- Bull spreads created from calls
  - A call price decreases as the strike price increases
  - The call bought is always more than the value of the call sold
  - A (bull) call spread requires an initial investment

Two Options of the Same Type – Spread Strategy

- Example
  - 5/30/2013
  - S&P 500 index options
  - S&P 500 index = $1,654

  - July 1645 (strike) call option
  - July 1665 (strike) call option, ……

Bull Spread Using Calls

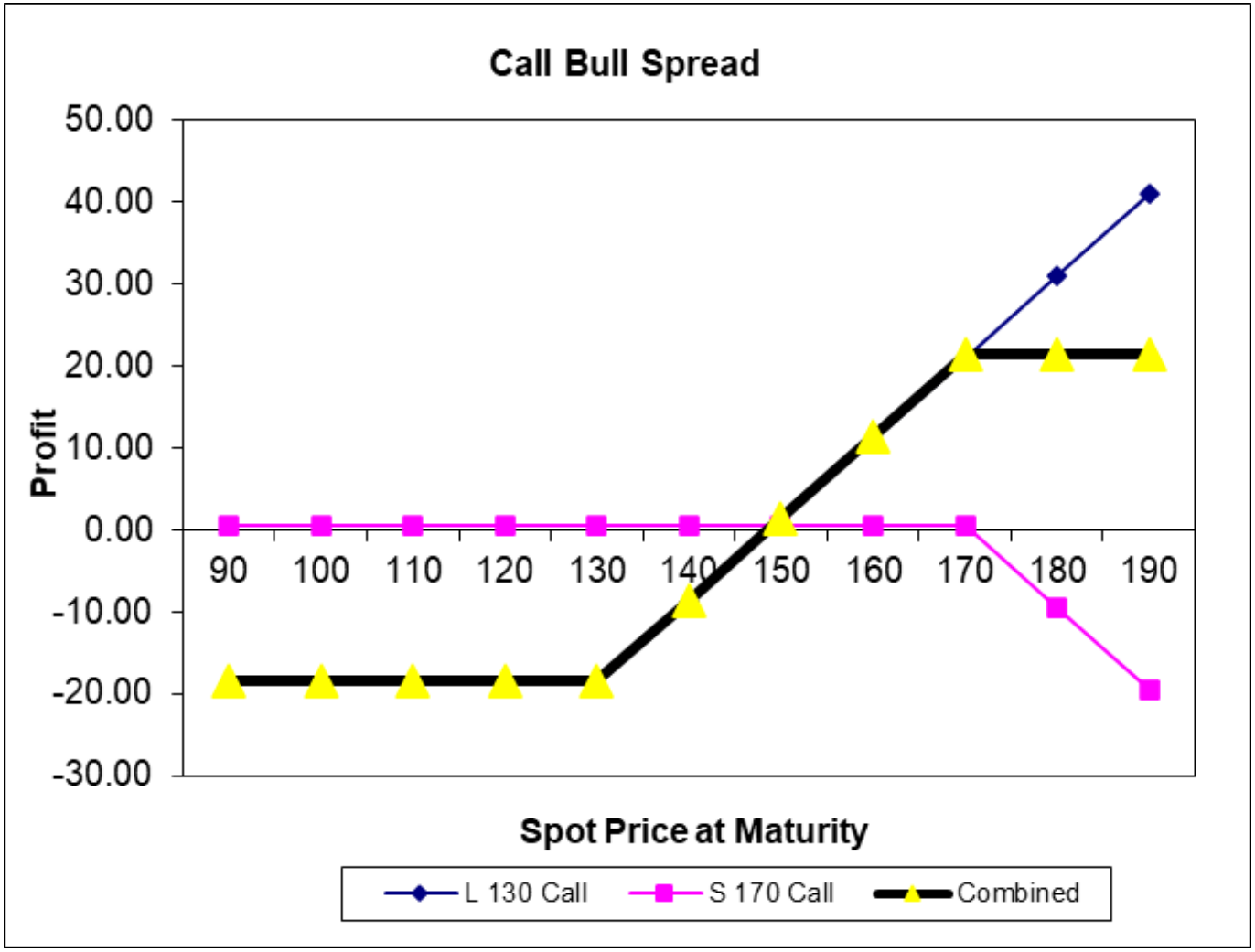
a. Create Call Bull Spread

Strategy: what are you buying and selling?

Trade	Strike	Premium
Buy December 130 Call at Ask	130	$ 18.95
Sell December 170 Call at Bid	170	$ 0.41

	Payoff			Profits		
St	L 130 Call	S 170 Call	Combined	L 130 Call	S 170 Call	Combined
90	$ -	$ -		$ (18.95)	$ 0.41	$ (18.54)
100	$ -	$ -		$ (18.95)	$ 0.41	$ (18.54)
110	$ -	$ -		$ (18.95)	$ 0.41	$ (18.54)
120	$ -	$ -		$ (18.95)	$ 0.41	$ (18.54)
130	$ -	$ -		$ (18.95)	$ 0.41	$ (18.54)
140	$ 10.00	$ -		$ (8.95)	$ 0.41	$ (8.54)
150	$ 20.00	$ -		$ 1.05	$ 0.41	$ 1.46
160	$ 30.00	$ -		$ 11.05	$ 0.41	$ 11.46
170	$ 40.00	$ -		$ 21.05	$ 0.41	$ 21.46
180	$ 50.00	$ (10.00)		$ 31.05	$ (9.59)	$ 21.46
190	$ 60.00	$ (20.00)		$ 41.05	$ (19.59)	$ 21.46

BULL SPREAD USING CALLS



Two Options of the Same Type – Spread Strategy

- Bull spreads created from puts
  - An investor expects the stock price will increase
  - Buy a put with a lower strike price and sell a put with a higher strike price
  - Both options have the same expiration date
  - The put bought is always less than the value of the put sold
  - A (bull) put spread involves a positive cash flow to a trader up front (ignoring margin requirement)

Bull Spread Using Puts

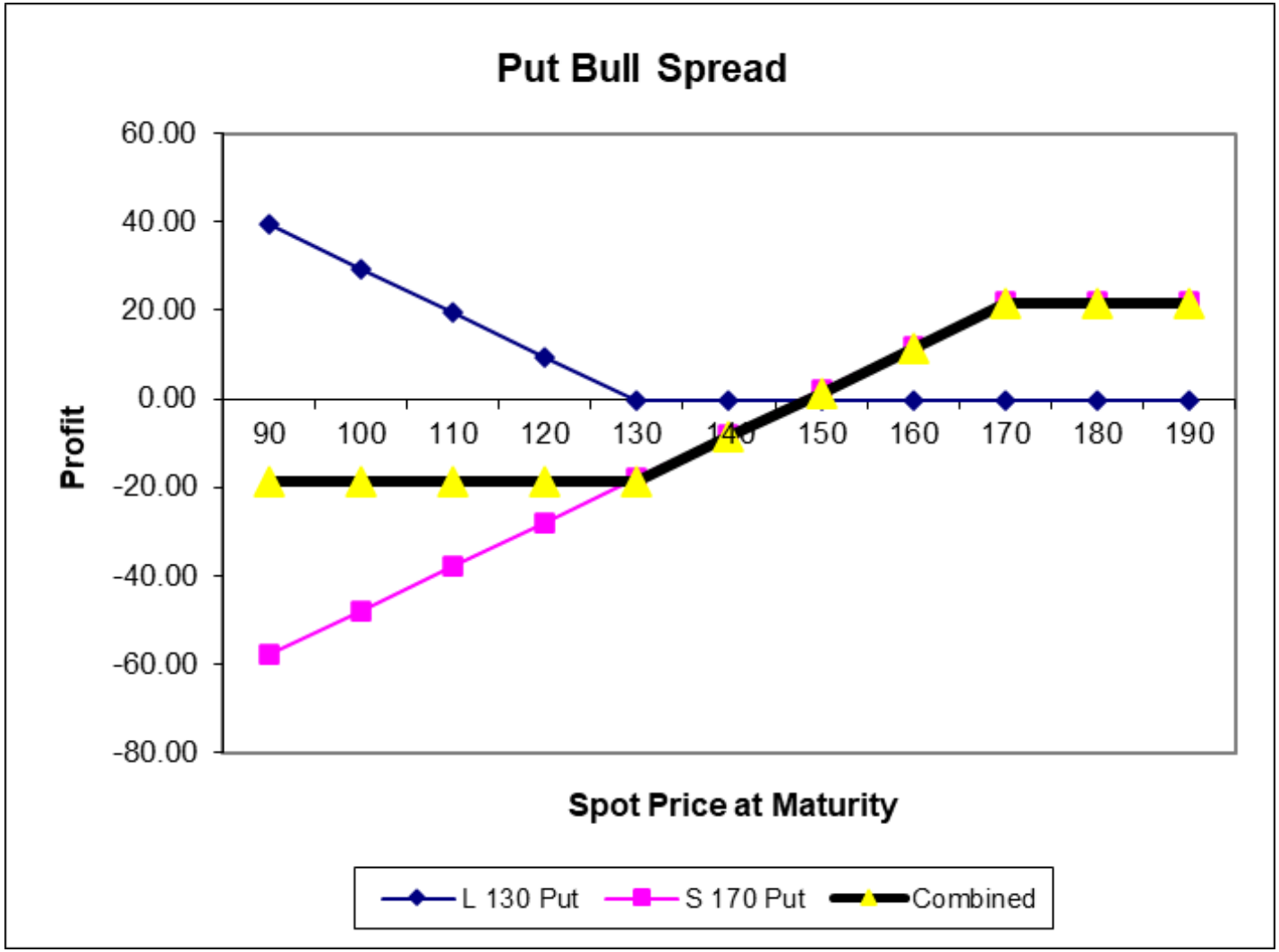
b. Create Put Bull Spread

Strategy: what are you buying and selling?

Trade	Strike	Premium
Buy December 130 Put at Ask	130	$ 0.58
Sell December 170 Put at Bid	170	$ 22.00

	Payoff			Profits		
St	L 130 Put	S 170 Put	Combined	L 130 Put	S 170 Put	Combined
90	$ 40.00	$ (80.00)	$ (40.00)	$ 39.42	$ (58.00)	$ (18.58)
100	$ 30.00	$ (70.00)	$ (40.00)	$ 29.42	$ (48.00)	$ (18.58)
110	$ 20.00	$ (60.00)	$ (40.00)	$ 19.42	$ (38.00)	$ (18.58)
120	$ 10.00	$ (50.00)	$ (40.00)	$ 9.42	$ (28.00)	$ (18.58)
130	$ -	$ (40.00)	$ (40.00)	$ (0.58)	$ (18.00)	$ (18.58)
140	$ -	$ (30.00)	$ (30.00)	$ (0.58)	$ (8.00)	$ (8.58)
150	$ -	$ (20.00)	$ (20.00)	$ (0.58)	$ 2.00	$ 1.42
160	$ -	$ (10.00)	$ (10.00)	$ (0.58)	$ 12.00	$ 11.42
170	$ -	$ -	$ -	$ (0.58)	$ 22.00	$ 21.42
180	$ -	$ -	$ -	$ (0.58)	$ 22.00	$ 21.42
190	$ -	$ -	$ -	$ (0.58)	$ 22.00	$ 21.42

Bull Spread Using Puts



Two Options of the Same Type – Spread Strategy

- Bear spreads created from calls
  - An investor expects the stock price will decline
  - Buy a call with a higher strike price and sell a call with a lower strike price
  - Both options have the same expiration date
  - The call bought is always less than the value of the call sold
  - A (bear) call spread involves a positive cash flow to a trader up front (ignoring margin requirement)

Bear Spread Using Calls

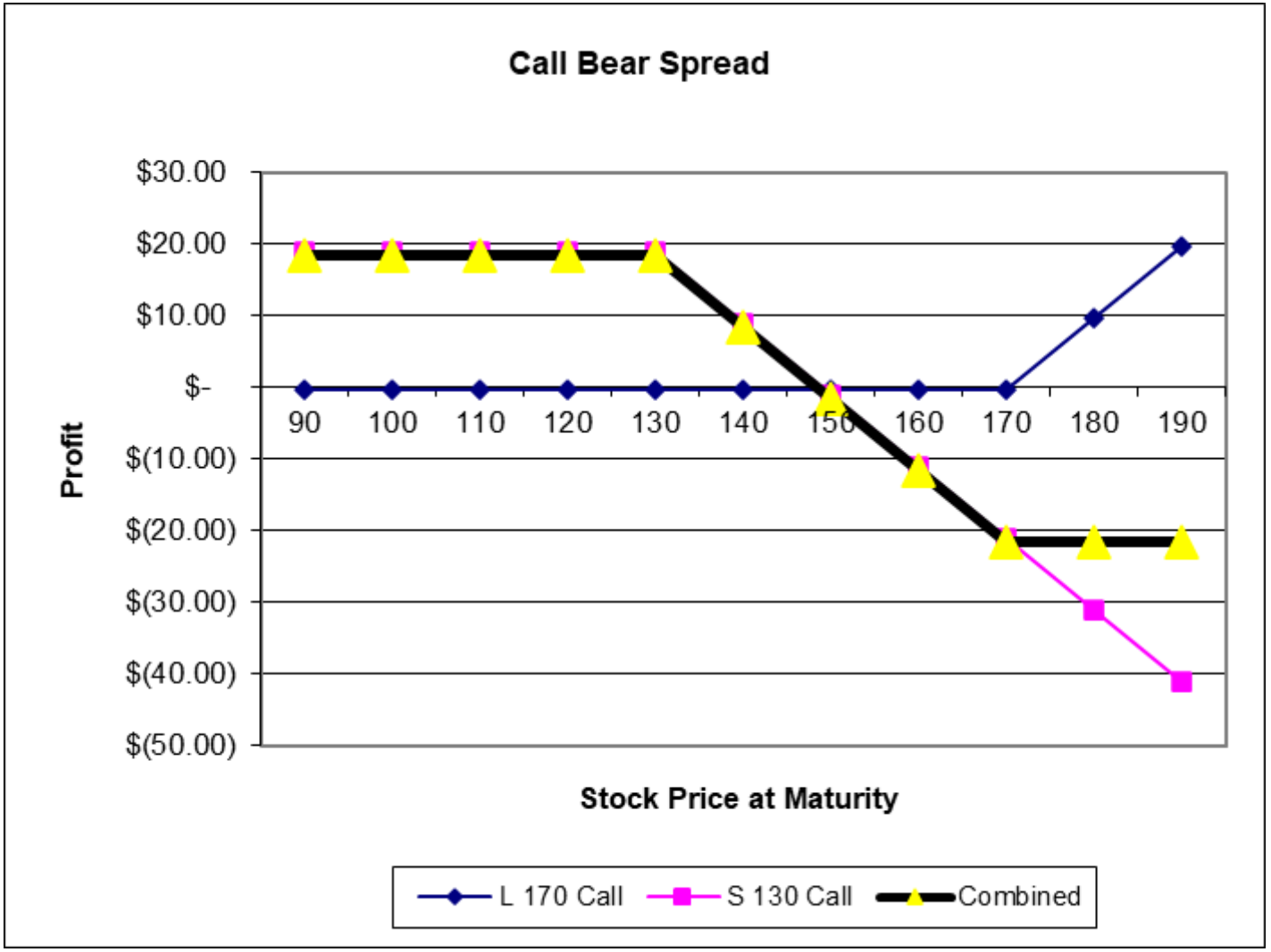
a. Create Call Bear Spread

Strategy: what are you buying and selling?

Trade	Strike	Premium
Buy December 170 Call at Ask	170	$ 0.41
Sell December 130 Call at Bid	130	$ 18.85

	Payoff			Profits		
St	L 170 Call	S 130 Call	Combined	L 170 Call	S 130 Call	Combined
90	$ -	$ -	$ -	$ (0.41)	$ 18.85	$ 18.44
100	$ -	$ -	$ -	$ (0.41)	$ 18.85	$ 18.44
110	$ -	$ -	$ -	$ (0.41)	$ 18.85	$ 18.44
120	$ -	$ -	$ -	$ (0.41)	$ 18.85	$ 18.44
130	$ -	$ -	$ -	$ (0.41)	$ 18.85	$ 18.44
140	$ -	$ (10.00)	$ (10.00)	$ (0.41)	$ 8.85	$ 8.44
150	$ -	$ (20.00)	$ (20.00)	$ (0.41)	$ (1.15)	$ (1.56)
160	$ -	$ (30.00)	$ (30.00)	$ (0.41)	$ (11.15)	$ (11.56)
170	$ -	$ (40.00)	$ (40.00)	$ (0.41)	$ (21.15)	$ (21.56)
180	$ 10.00	$ (50.00)	$ (40.00)	$ 9.59	$ (31.15)	$ (21.56)
190	$ 20.00	$ (60.00)	$ (40.00)	$ 19.59	$ (41.15)	$ (21.56)

Bear Spread Using Calls



Two Options of the Same Type – Spread Strategy

- Bear spreads created from puts
  - An investor expects the stock price will decline
  - Buy a put with a higher strike price and sell a put with a lower strike price
  - Both options have the same expiration date
  - The put bought is always more than the value of the put sold
  - A (bear) put spread requires an initial investment

Bear Spread Using Puts

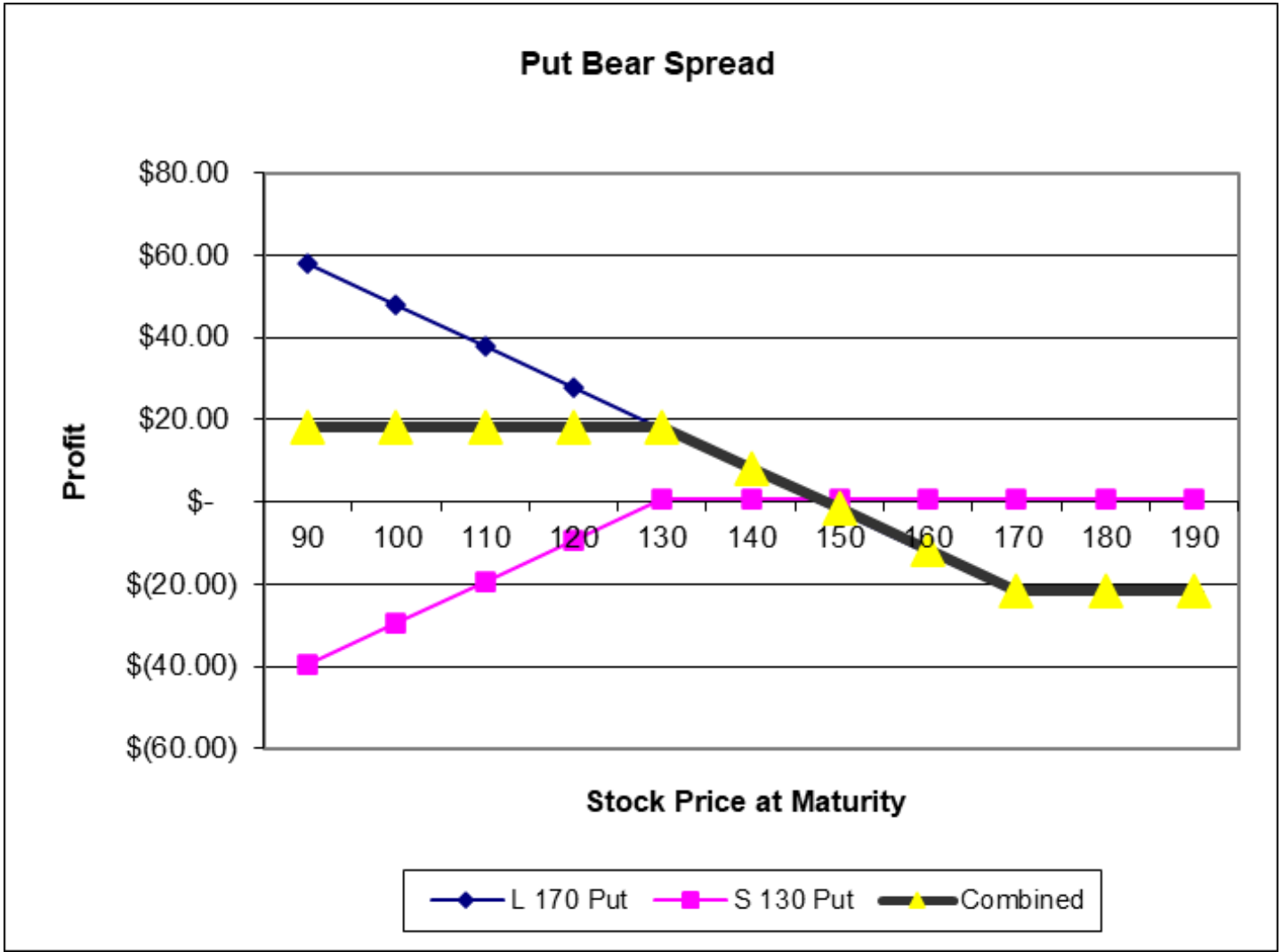
b. Create Put Bear Spread

Strategy: what are you buying and selling?

Trade	Strike	Premium
Buy December 170 Put at Ask	170	$ 22.20
Sell December 130 Put at Bid	130	$ 0.57

	Payoff			Profits		
St	L 170 Put	S 130 Put	Combined	L 170 Put	S 130 Put	Combined
90	$ 80.00	$ (40.00)	$ 40.00	$ 57.80	$ (39.43)	$ 18.37
100	$ 70.00	$ (30.00)	$ 40.00	$ 47.80	$ (29.43)	$ 18.37
110	$ 60.00	$ (20.00)	$ 40.00	$ 37.80	$ (19.43)	$ 18.37
120	$ 50.00	$ (10.00)	$ 40.00	$ 27.80	$ (9.43)	$ 18.37
130	$ 40.00	$ -	$ 40.00	$ 17.80	$ 0.57	$ 18.37
140	$ 30.00	$ -	$ 30.00	$ 7.80	$ 0.57	$ 8.37
150	$ 20.00	$ -	$ 20.00	$ (2.20)	$ 0.57	$ (1.63)
160	$ 10.00	$ -	$ 10.00	$ (12.20)	$ 0.57	$ (11.63)
170	$ -	$ -	$ -	$ (22.20)	$ 0.57	$ (21.63)
180	$ -	$ -	$ -	$ (22.20)	$ 0.57	$ (21.63)
190	$ -	$ -	$ -	$ (22.20)	$ 0.57	$ (21.63)

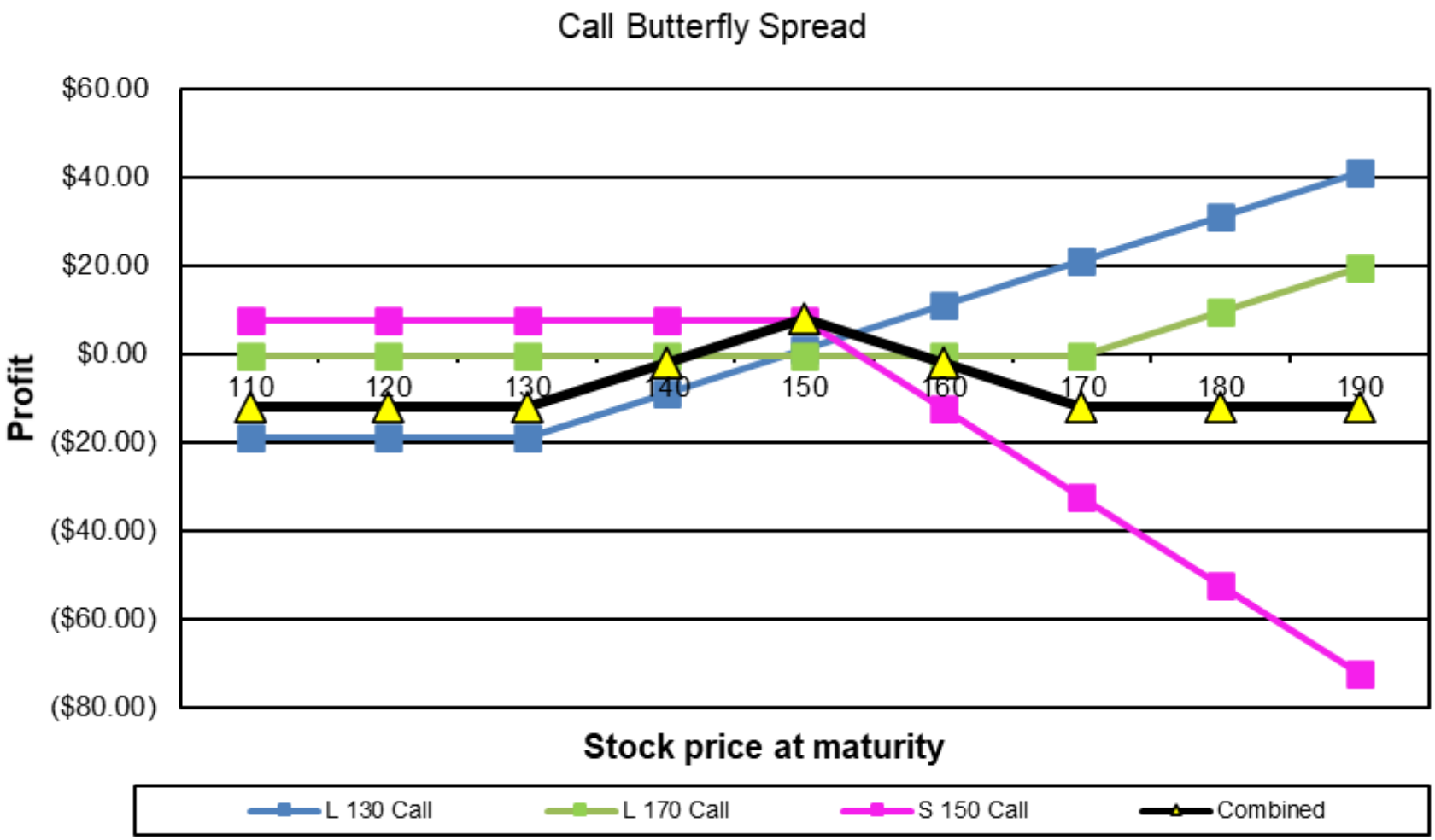
Bear Spread Using Puts



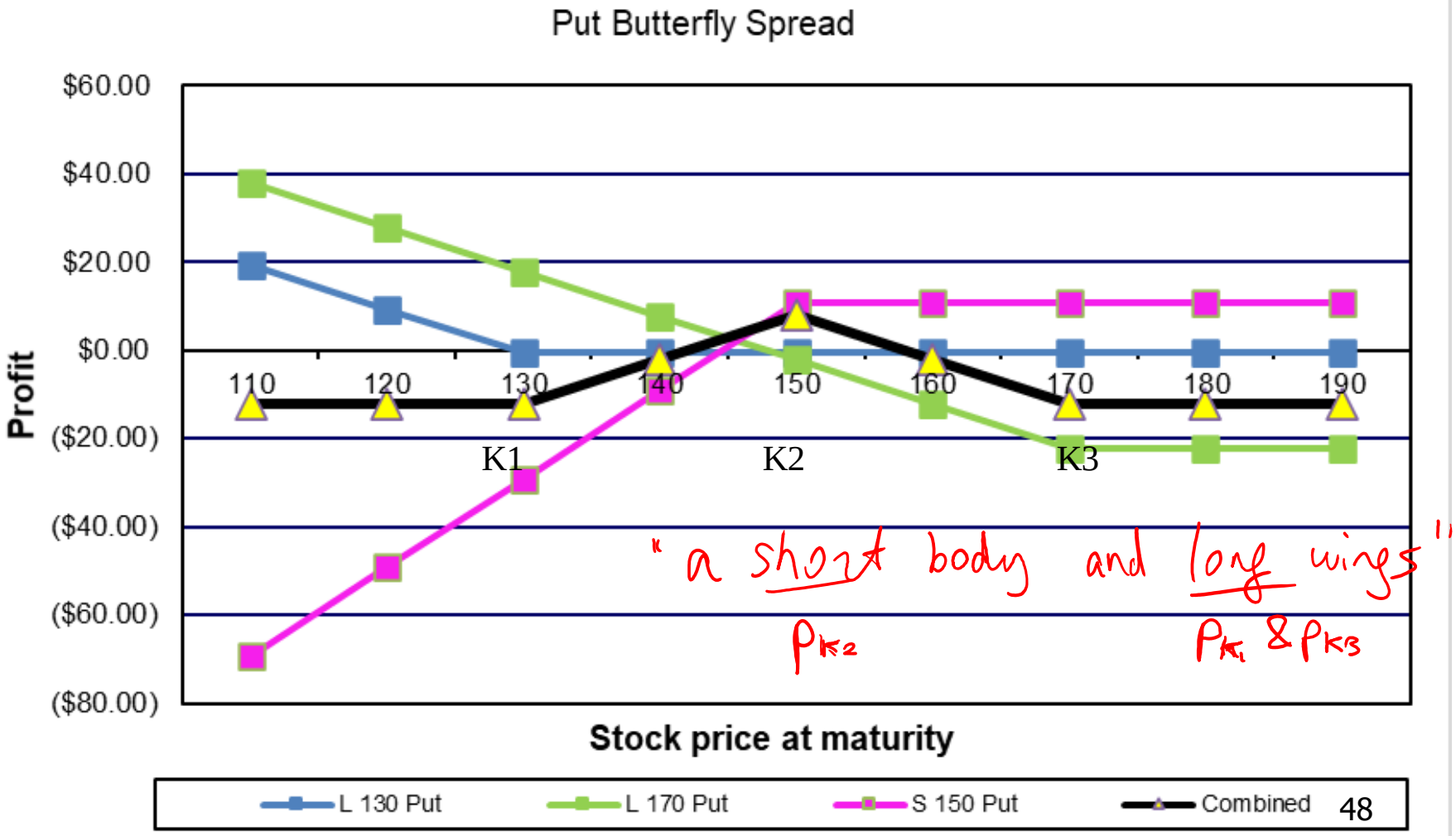
Strategies Involving More Than Two Options

- Butterfly spreads
  - Buy a call with a low strike, buy a call with a high strike. Sell two calls with an intermediate strike price
  - Or buy a put with a low strike, buy a put with a high strike. Sell two puts with an intermediate strike price
  - It is appropriate for investors who feel that large price moves are unlikely
  - It requires a small investment initially

Butterfly Spread Using Calls

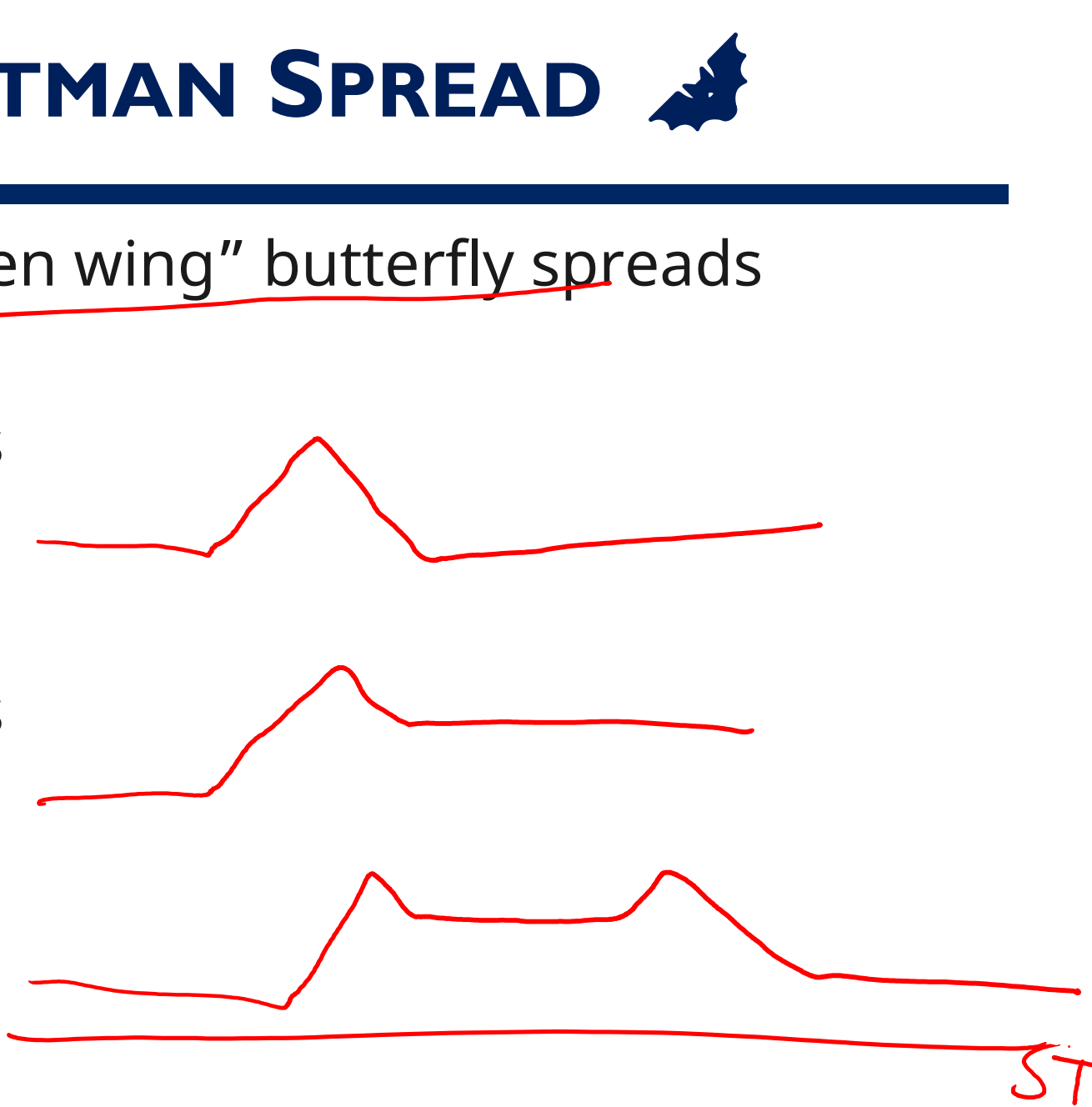


BUTTERFLY SPREAD USING PUTS



Batman Spread

- Two “broken wing” butterfly spreads
- +1x ___ call
- -2x ___ calls
- +1x ___ call
- +1x ___ call
- -2x ___ calls
- +1x ___ call



A Mixture of Calls and Puts - Combination

A Mixture of Calls and Puts - Combination

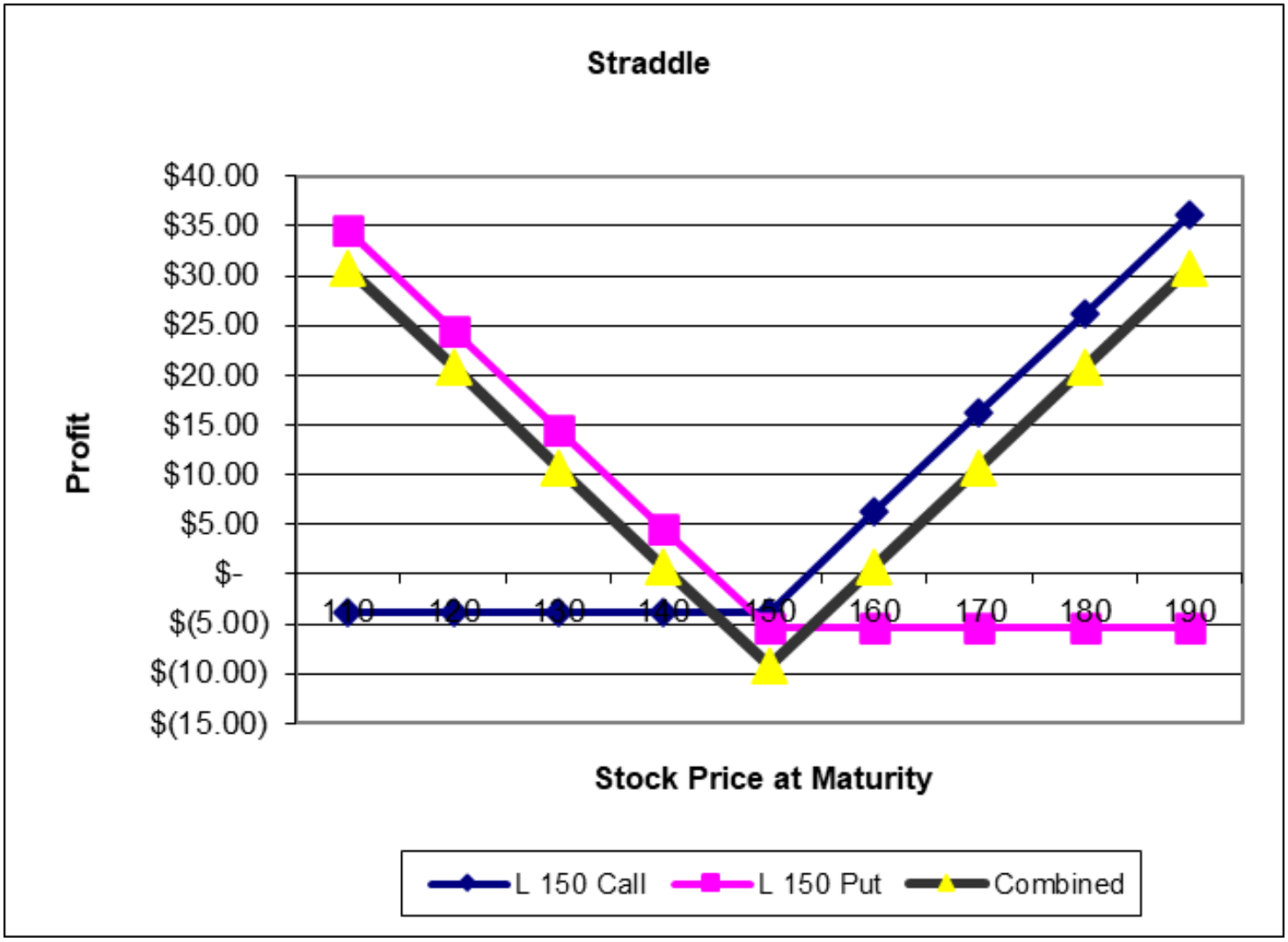
- Straddles
  - Buy a call and a put with the same strike price and expiration date
  - This strategy results in a profit if there is a large change in the stock price in either direction
  - It is appropriate when an investor expects a large move in a stock price but does not know in which direction the move will be
    - The move should be larger than what other market participants expect, which is already priced in

A Straddle Combination

Strategy: what are you buying and selling?		
Trade	Strike	Premium
Buy December 150 Call at Ask	150	$ 3.80
Buy December 150 Put at Ask	150	$ 5.45

	Payoff			Profits		
St	L 150 Call	L 150 Put	Combined	L 150 Call	L 150 Put	Combined
110	$ -	$ 40.00	$ 40.00	$ (3.80)	$ 34.55	$ 30.75
120	$ -	$ 30.00	$ 30.00	$ (3.80)	$ 24.55	$ 20.75
130	$ -	$ 20.00	$ 20.00	$ (3.80)	$ 14.55	$ 10.75
140	$ -	$ 10.00	$ 10.00	$ (3.80)	$ 4.55	$ 0.75
150	$ -	$ -	$ -	$ (3.80)	$ (5.45)	$ (9.25)
160	$ 10.00	$ -	$ 10.00	$ 6.20	$ (5.45)	$ 0.75
170	$ 20.00	$ -	$ 20.00	$ 16.20	$ (5.45)	$ 10.75
180	$ 30.00	$ -	$ 30.00	$ 26.20	$ (5.45)	$ 20.75
190	$ 40.00	$ -	$ 40.00	$ 36.20	$ (5.45)	$ 30.75

A Straddle Combination



A Mixture of Calls and Puts - Combination

- Strangles
  - Buy a call and a put with the same expiration date and different strike prices
  - The investor bets that there will be a large price move but is uncertain about the direction of the move
  - This strategy is similar to a straddle
  - The downside risk is less with a strangle

A Strangle Combination

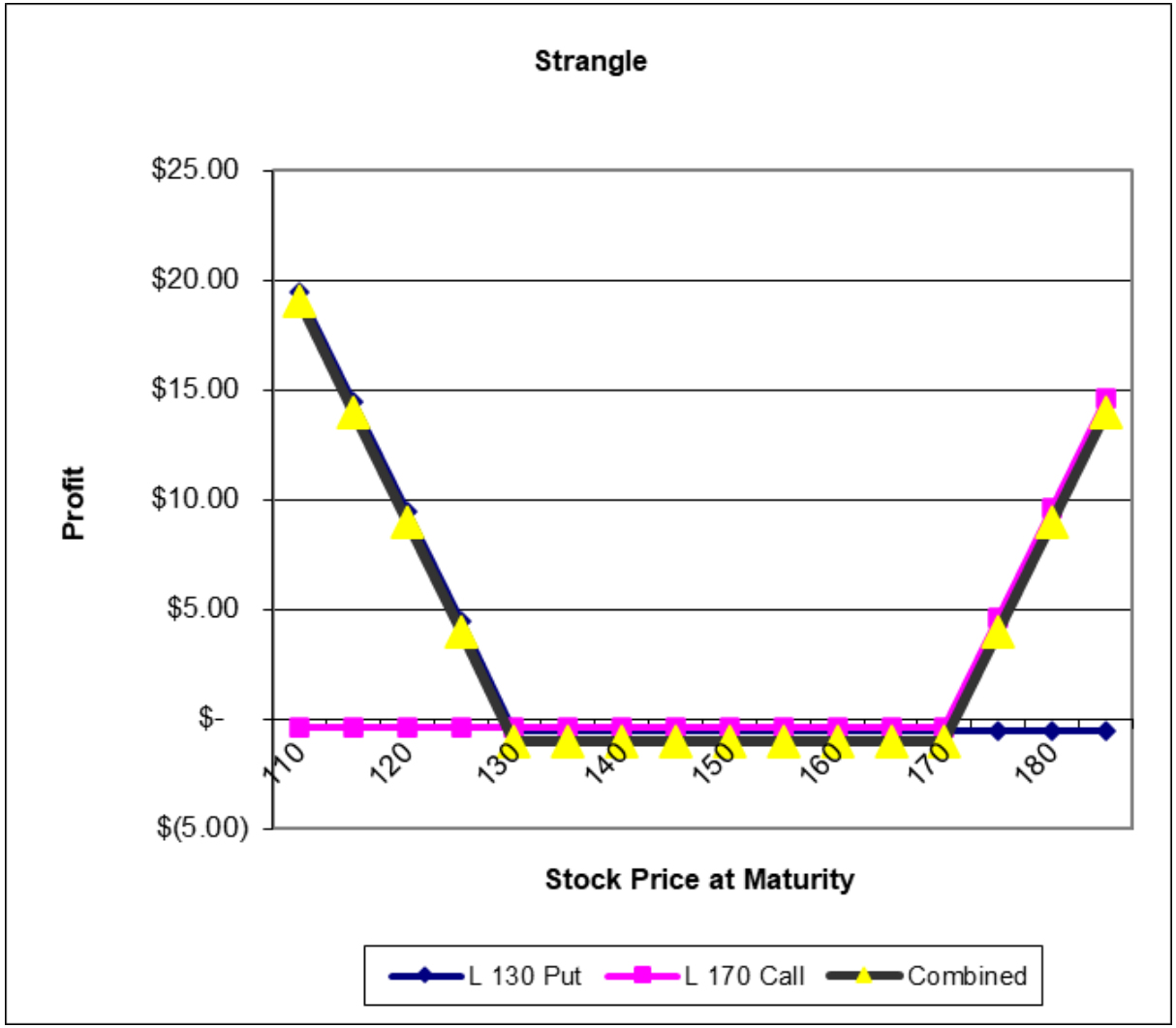
b.Create a Strangle

Strategy: what are you buying and selling?

Trade	Strike	Premium
Buy December 130 Put at Ask	130	$ 0.58
Buy December 170 Call at Ask	170	$ 0.41

	Payoff			Profits		
St	L 130 Put	L 170 Call	Combined	L 130 Put	L 170 Call	Combined
110	$ 20.00	$ -	$ 20.00	$ 19.42	$ (0.41)	$ 19.01
115	$ 15.00	$ -	$ 15.00	$ 14.42	$ (0.41)	$ 14.01
120	$ 10.00	$ -	$ 10.00	$ 9.42	$ (0.41)	$ 9.01
125	$ 5.00	$ -	$ 5.00	$ 4.42	$ (0.41)	$ 4.01
130	$ -	$ -	$ -	$ (0.58)	$ (0.41)	$ (0.99)
135	$ -	$ -	$ -	$ (0.58)	$ (0.41)	$ (0.99)
140	$ -	$ -	$ -	$ (0.58)	$ (0.41)	$ (0.99)
145	$ -	$ -	$ -	$ (0.58)	$ (0.41)	$ (0.99)
150	$ -	$ -	$ -	$ (0.58)	$ (0.41)	$ (0.99)
155	$ -	$ -	$ -	$ (0.58)	$ (0.41)	$ (0.99)
160	$ -	$ -	$ -	$ (0.58)	$ (0.41)	$ (0.99)
165	$ -	$ -	$ -	$ (0.58)	$ (0.41)	$ (0.99)
170	$ -	$ -	$ -	$ (0.58)	$ (0.41)	$ (0.99)
175	$ -	$ 5.00	$ 5.00	$ (0.58)	$ 4.59	$ 4.01
180	$ -	$ 10.00	$ 10.00	$ (0.58)	$ 9.59	$ 9.01
185	$ -	$ 15.00	$ 15.00	$ (0.58)	$ 14.59	$ 14.01

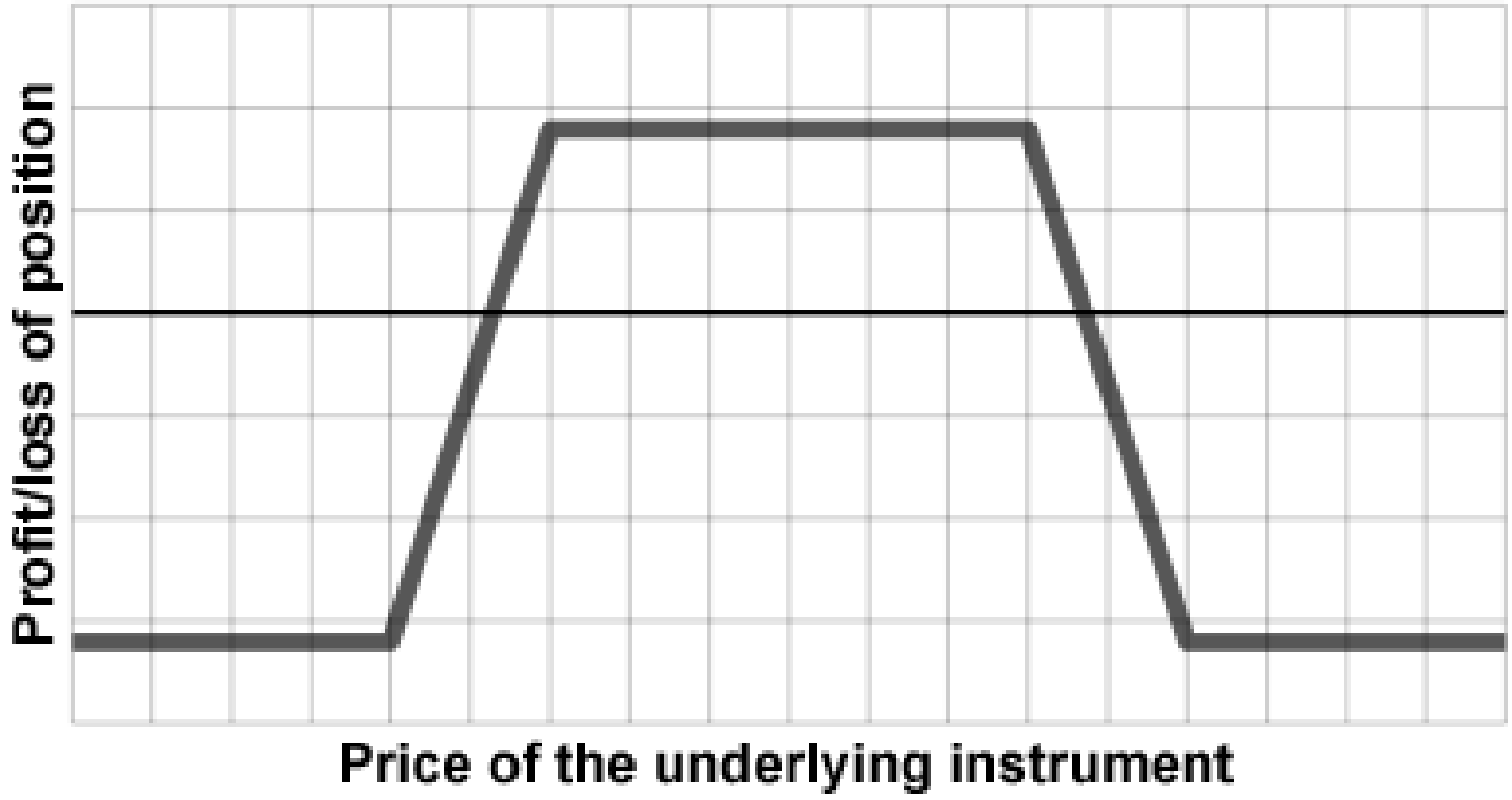
A Strangle Combination



A Mixture of Calls and Puts - Combination

- Iron Condor
  - Bull put spread + bear call spread
  - Similar to a short strangle, but less downside risk
  - The investor bets that there will be a small price move

A Condor Combination



A Mixture of Calls and Puts - Combination

- Strip
  - Buy a call and two puts with the same expiration date and the same strike price
  - The investor bets that there will be a larger down-side move in share price

STRIP

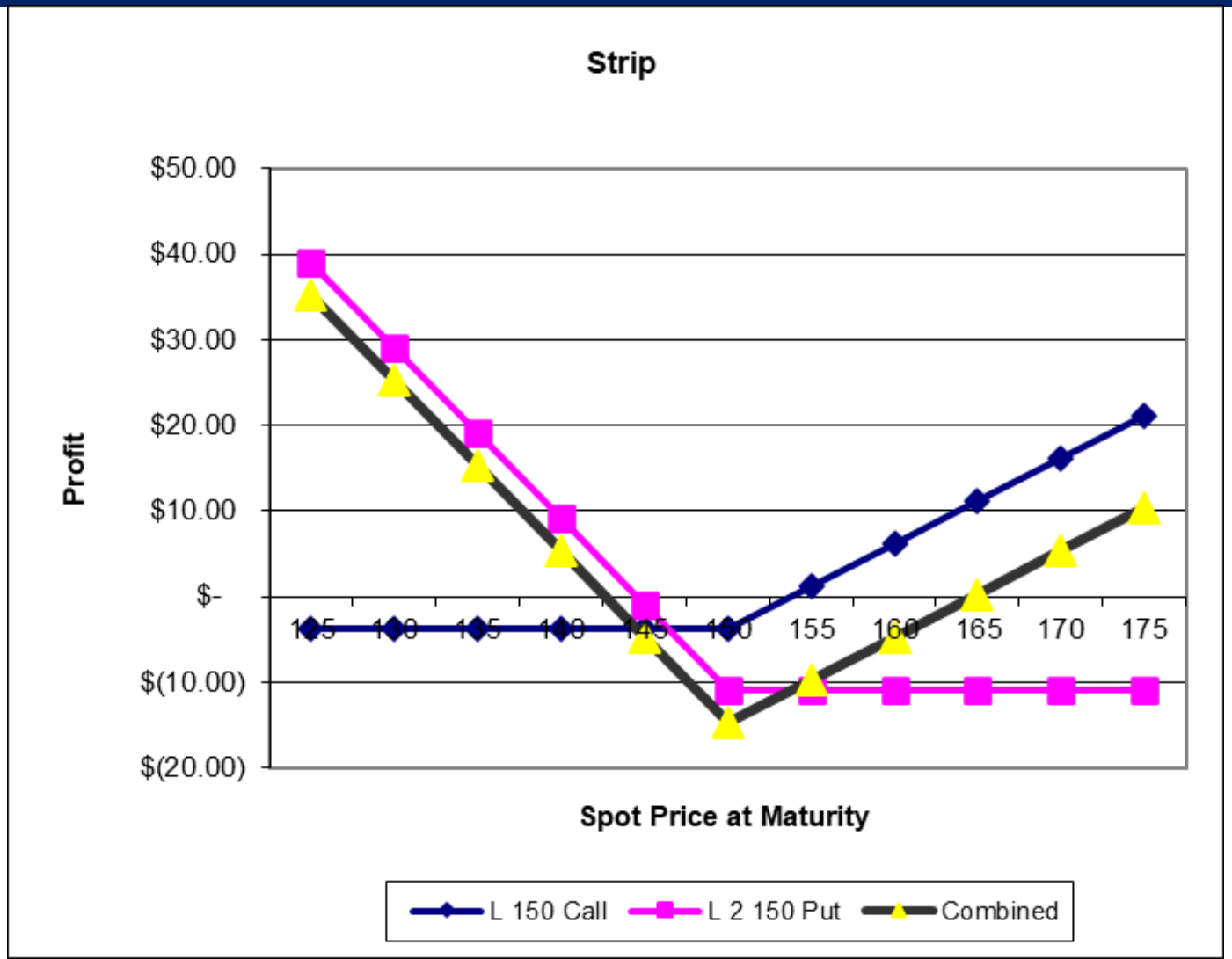
a.Create a Strip

Strategy: what are you buying and selling?

Trade	Strike	Premium
Buy December 150 Call at Ask	150	$ 3.80
Buy TWO December 150 Put at Ask	150	$ 5.45

	Payoff			Profits		
St	L 150 Call	L 2 150 Put	Combined	L 150 Call	L 2 150 Put	Combined
125	$ -	$ 50.00	$ 50.00	$ (3.80)	$ 39.10	$ 35.30
130	$ -	$ 40.00	$ 40.00	$ (3.80)	$ 29.10	$ 25.30
135	$ -	$ 30.00	$ 30.00	$ (3.80)	$ 19.10	$ 15.30
140	$ -	$ 20.00	$ 20.00	$ (3.80)	$ 9.10	$ 5.30
145	$ -	$ 10.00	$ 10.00	$ (3.80)	$ (0.90)	$ (4.70)
150	$ -	$ -	$ -	$ (3.80)	$ (10.90)	$ (14.70)
155	$ 5.00	$ -	$ 5.00	$ 1.20	$ (10.90)	$ (9.70)
160	$ 10.00	$ -	$ 10.00	$ 6.20	$ (10.90)	$ (4.70)
165	$ 15.00	$ -	$ 15.00	$ 11.20	$ (10.90)	$ 0.30
170	$ 20.00	$ -	$ 20.00	$ 16.20	$ (10.90)	$ 5.30
175	$ 25.00	$ -	$ 25.00	$ 21.20	$ (10.90)	$ 10.30

Strip


Strip
$50.00
$40.00
$30.00
$20.00
$10.00
$-
$(10.00)
$(20.00)
Profit
155
160
165
170
175
Spot Price at Maturity
L 150 Call
L 2 150 Put
Combined

A Mixture of Calls and Puts - Combination

- Strap
  - Buy two calls and one put with the same expiration date and the same strike price
  - The investor bets that there will be a larger up-side move in share price

STRAP

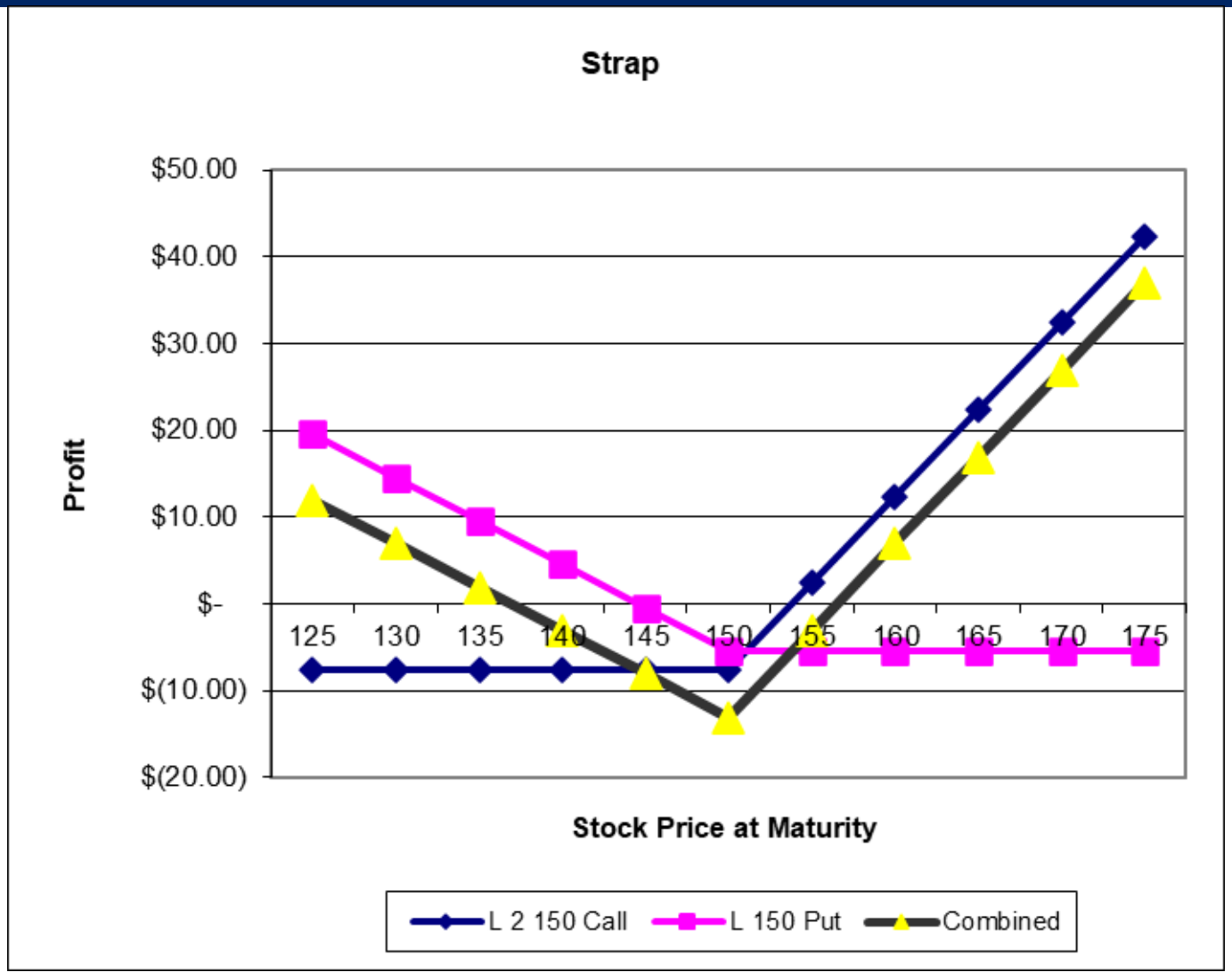
b.Create a Strap

Strategy: what are you buying and selling?

Trade	Strike	Premium
Buy TWO December 150 Call at As	150	$ 3.80
Buy December 150 Put at Ask	150	$ 5.45

	Payoff			Profits		
St	L 2 150 Call	L 150 Put	Combined	L 2 150 Call	L 150 Put	Combined
125	$ -	$ 25.00	$ 25.00	$ (7.60)	$ 19.55	$ 11.95
130	$ -	$ 20.00	$ 20.00	$ (7.60)	$ 14.55	$ 6.95
135	$ -	$ 15.00	$ 15.00	$ (7.60)	$ 9.55	$ 1.95
140	$ -	$ 10.00	$ 10.00	$ (7.60)	$ 4.55	$ (3.05)
145	$ -	$ 5.00	$ 5.00	$ (7.60)	$ (0.45)	$ (8.05)
150	$ -	$ -	$ -	$ (7.60)	$ (5.45)	$ (13.05)
155	$ 10.00	$ -	$ 10.00	$ 2.40	$ (5.45)	$ (3.05)
160	$ 20.00	$ -	$ 20.00	$ 12.40	$ (5.45)	$ 6.95
165	$ 30.00	$ -	$ 30.00	$ 22.40	$ (5.45)	$ 16.95
170	$ 40.00	$ -	$ 40.00	$ 32.40	$ (5.45)	$ 26.95
175	$ 50.00	$ -	$ 50.00	$ 42.40	$ (5.45)	$ 36.95

STRAP


Strap
$50.00
$40.00
$30.00
$20.00
$10.00
$-
$(10.00)
$(20.00)
Profit
125
130
135
140
145
150
155
160
165
170
175
Stock Price at Maturity
L 2 150 Call
L 150 Put
Combined

Discussion Questions for Class

- Tradeoffs between strategies:
  - Compare up front cost vs payoff at T
    - Call bull spread (initial cost) vs. put bull spread (initial cash inflow)
  - Compare upside vs downside
    - Strangle vs straddle
- Effect of using American instead of European options
- Consider that market expectations are already priced into the option premium
  - E.g., a bet on volatility is only profitable if the stock is more volatile than other market participants had expected
    - More volatile stocks will have higher option premia (more costly)
- Margin requirements are lower for spread strategies than for naked option writing

Use in practice

- Overlay strategies
  - Add option writing or other option strategies to diversified portfolio to generate more income during sideways or bull markets
- Hedge funds?
  - Andrew Lo showed that hedge fund returns resembled those of an out-of-the-money put writing strategy…
    - "outperformance" (or more likely: compensation for taking on certain risks)
    - infrequent large losses (consistent with avg hedge fund life of 3-5yrs)
    - Are hedge funds worth the high fees? At least research the strategy first...
- Note that many statistical measures are not designed to evaluate non-linear option payoffs
  - Factor models may show alpha when there is none
  - Risk exposures may be mismeasured and tail risk may not be properly captured

Summary

- **Options can be combined to create various distinct payoff profiles**
- **Spread strategies combine two or more options of the same type**
- Bull spread
- Bear spread
- **Combination strategies are mixtures of calls and puts**
- Straddle
- Butterfly
- Strip
- Strangle
- Iron condor
- Strap

Finance 2325

Homework 15 & 16

Chapter 11. Trading strategies involving options

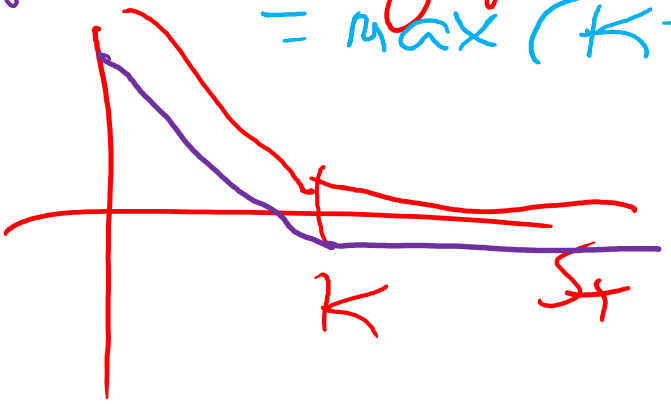
Questions 11.2, 11.3, 11.6, 11.13, 11.17

Option Strategies Excel exercises

① long put

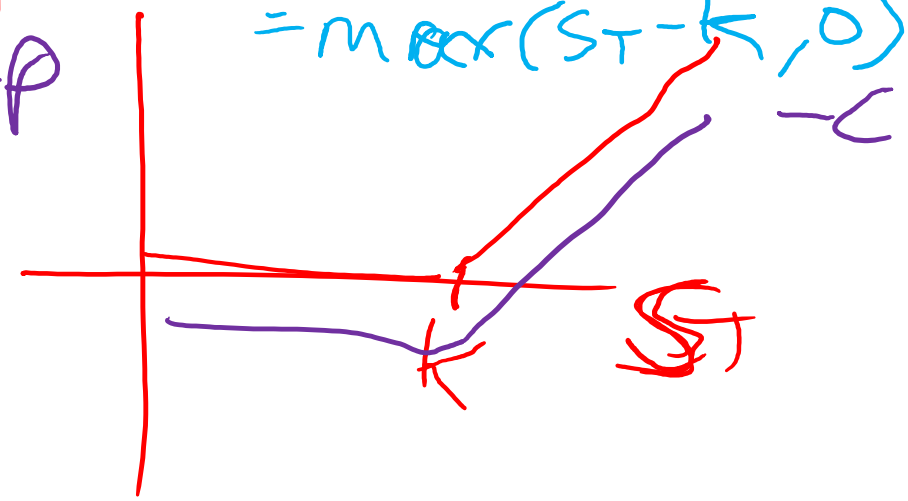
profit

$= \max(K - S_T, 0) - p$



② long call

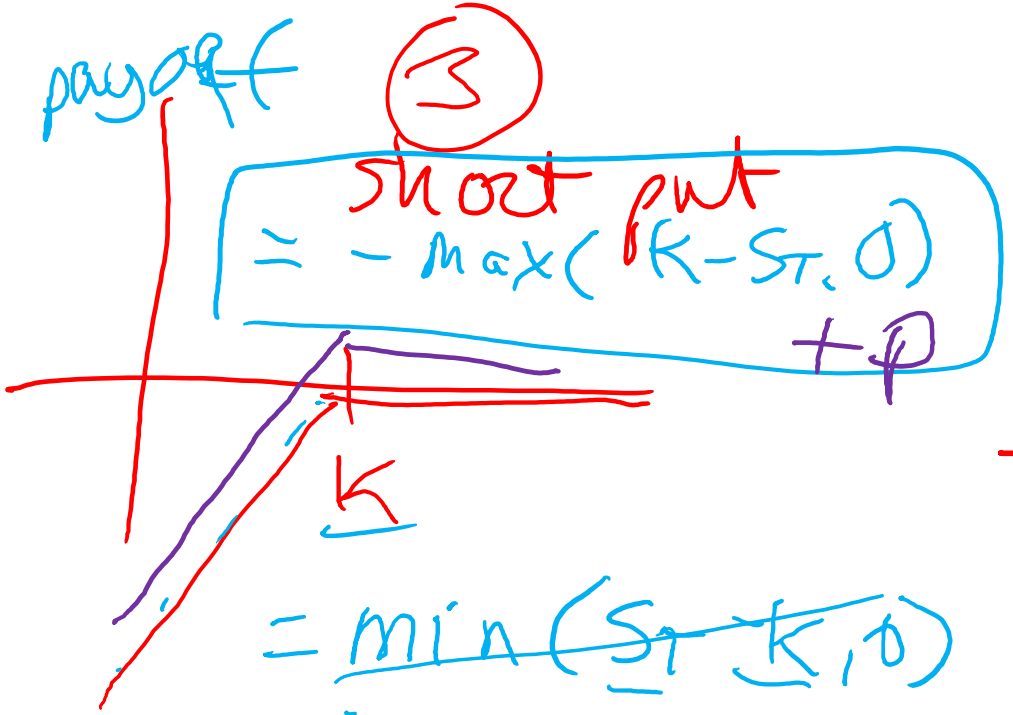
$= \max(S_T - K, 0) - C$



③ short put

$= -\max(K - S_T, 0) + p$

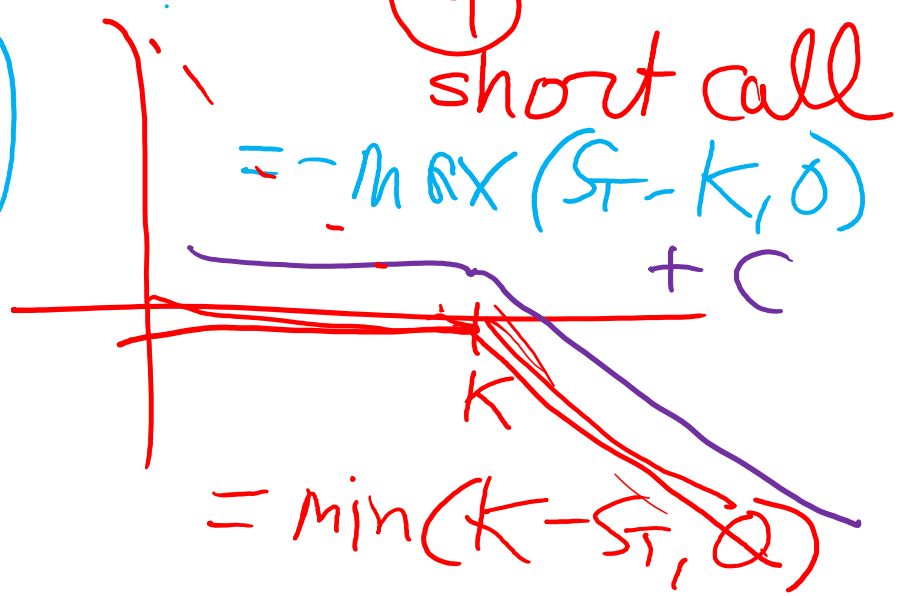
payoff



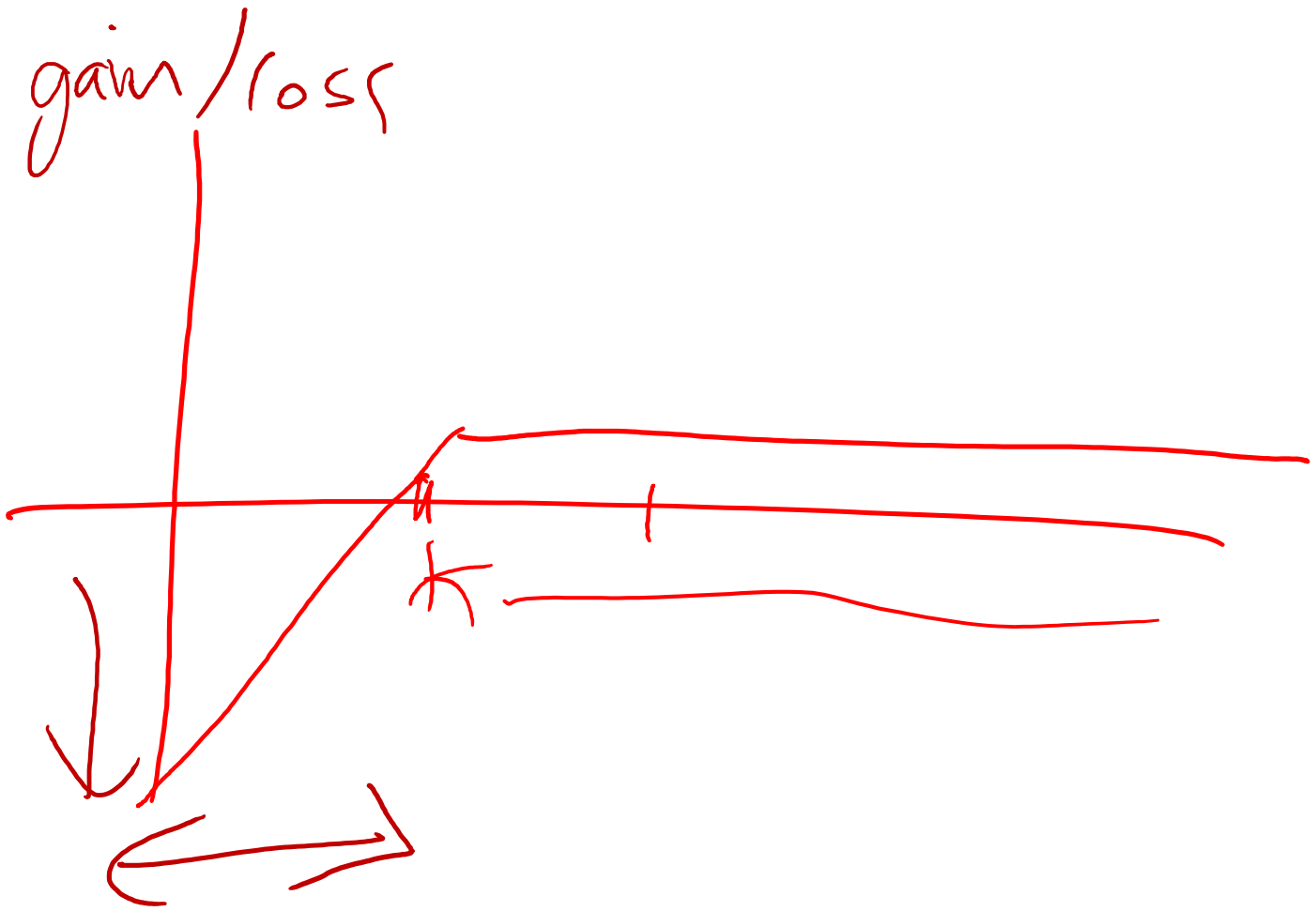
$= \min(S_T - K, 0)$

④ short call

$= -\max(S_T - K, 0) + C$



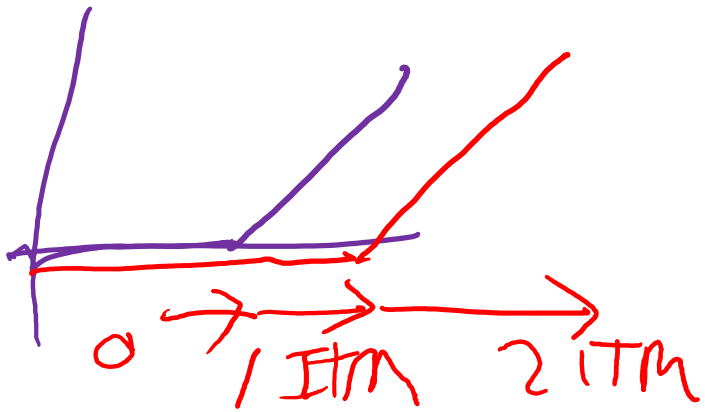
$= \min(K - S_T, 0)$

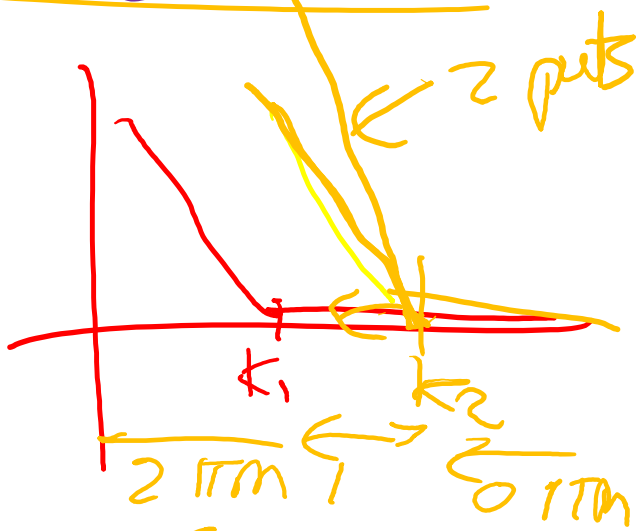

gain/loss

1) kinks at strikes

2) slopes depend on quantity bought/sold

3)





build call spreads L to R

build put spreads right to left


S_T
k_1
k_2
long call$_1$
short call$_2$