

## EC3070 FINANCIAL DERIVATIVES

### Exercise 3 - Trading Strategies

Table 1 below (Hull: Table 1.2, p. 7) contains information on the prices different call and put options on an Intel stock with the same expiration date (October) had on the 12<sup>th</sup> of September 2006:

Table 1

Strike Price	Oct Call	Oct Put
15.00	4.650	0.025
17.50	2.300	0.125
20.00	0.575	0.875
22.50	0.075	2.950
25.00	0.025	5.450

Intel Option Prices (Sept 12, 2006; Stock Price=19.56); (Table 1.2 page 7, Hull); Source: CBOE

1. (Use Table 1)
  - a. Explain how a strangle can be created using a call option with strike price of \$22.50 and a put option with strike price of \$17.50. What is the pattern of profits from the strangle?
  - b. Explain how to create a strangle with a call option with strike price of \$25.00 and a put option with strike price of \$15.00. What is the pattern of profits from the new strangle?
  - c. Suppose you try to create a strangle using a call option with strike price of \$17.50 and a put option with strike price of \$22.50. What is the result?
  - d. Compare the profit function of the strategies in your answers to (a), (b) and (c).
  - e. What is the difference between a straddle and a strangle?
  
2. (Use Table 1)
  - a. Create a butterfly spread strategy using call options with strike prices of \$17.50, \$20.00 and \$22.50.

- b. Draw a diagram showing an investor's profit and loss as a function of the stock price at maturity.
  - c. For what range of the underlying stock price will this strategy lead to a loss?
  - d. What profit will it yield if the stock had a spot price at maturity equal to \$20.
  - e. Create another butterfly spread using put options with strike prices \$15, \$20 and \$25.
  - f. For what range of the underlying stock price will this strategy lead to a loss?
  - g. What profit will it yield if the stock has a spot price at maturity equal to \$20.
  
  - h. Under which circumstances would you advise an investor to acquire a butterfly spread?
3. (Use Table 1)
- a. Create a bull spread using call options with strike prices \$17.50 and \$22.50.
  - b. Create a bear spread using put options with strike prices \$17.50 and \$22.50.
  - c. The combination of the two portfolios above creates a box spread. Show that the profit from this strategy is equal to the difference among the two strike prices for any value of the spot price at maturity.
  - d. Show that two of the options used to create the box spread can be combined to create a long forward position, while the other two can be combined to create a short forward position.
4. Draw a diagram showing an investor's profit and loss as a function of the stock price at maturity for portfolios consisting of:
- a. One share and a short position in one call option.
  - b. Two shares and a short position in one call option.
  - c. One share and a short position in two call options.
  - d. One share and a short position in four call options.
5. Use the put-call parity to relate the initial investment for a bull spread created using calls to the initial investment for a bull spread created using puts.

References: Hull, chapters 1, 10.