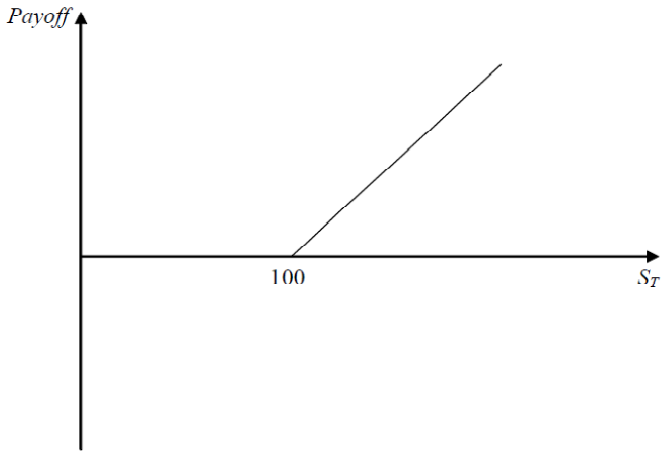
**ECON 133 – Securities Markets – FALL 2010, UCSC**

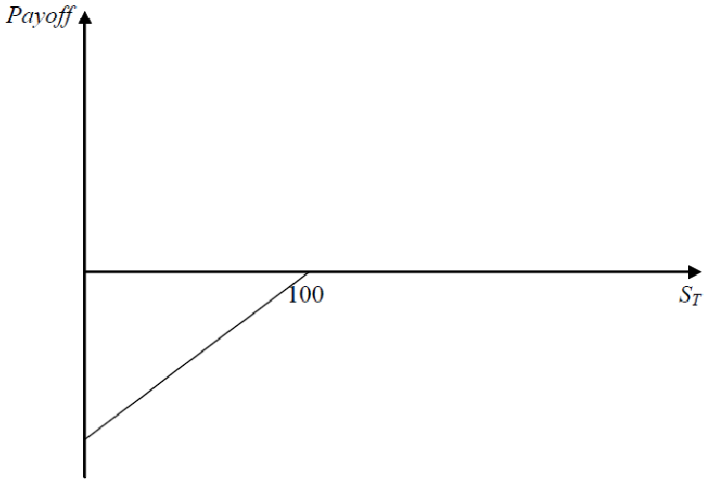
**Answer Key – HOMEWORK # 6**

1. Nick Leeson brought down Barings by betting on Nikkei index options. The strategy he employed is called a short straddle. Answer the follow questions on the short straddle.

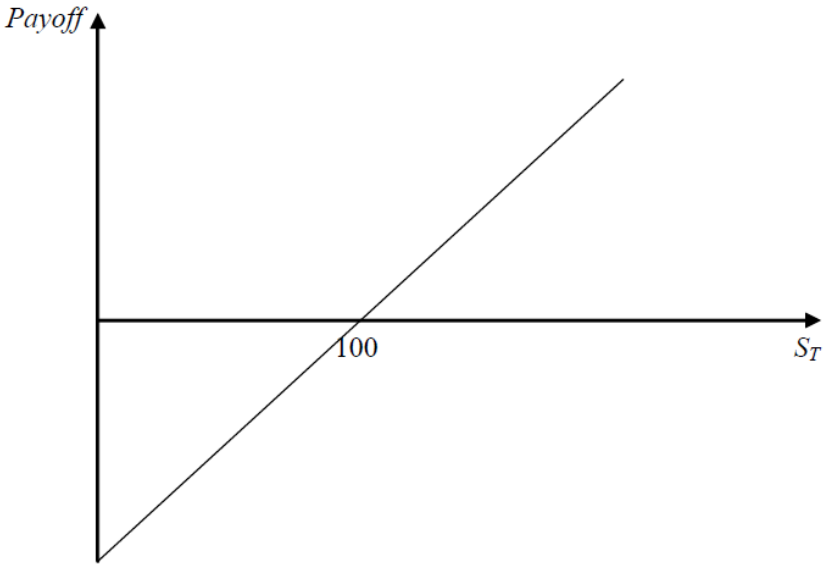
   a) Draw the payoff function of writing a call option on the index with exercise price of $100 (label axes and all relevant points).




   b) Draw the payoff function of writing a put option on the same index, also with a $100 exercise price (label axes and all relevant points).



c) If the price for buying a call in a) is \$5 and the put in b) is also \$5, draw the PROFIT function of short straddle. That is, what is the PROFIT function of writing the call in a) and the put in b) at the same time?




d) A short straddle will make money only when the underlying index fluctuates inside a particular price range. Find out the range.

ANS: Portfolio 1 includes buying a call and writing a put. Cash outflow for constructing such a portfolio is $C - P = 15 - P$.

Portfolio 2 includes the stock and the borrowing. Cash outflow for constructing such a portfolio is $90 - \frac{100}{1.05} = -5.24$.

Two portfolios having identical payoff must have the same initial investment: $15 - P = -5.24 \Rightarrow P = 20.24$.

2. **CH.15.5** You purchase one 1BM March 100 put contract for a premium of \$6.47, what is your maximum possible profit? (See Figure 15.1.)

ANS: If the stock price drops to zero, you will make 100 – 6.47 per stock, or 93.53. Given 100 units per contract, your total potential profit is \$9,353.

3. **CH.15.6** An investor buys a call at a price of \$4.50 with an exercise price of \$40. At what stock price will the investor break even on the purchase of the call?

ANS: Break even = 40 + 4.50 = 44.50

4. **CH.15.7** You establish a straddle on Intel using September call and put options with a strike price of $50. The call premium is $4.25 and the put premium is $5.00.

a) What is the most you can lose on this position?

ANS: Maximum loss = 4.25 + 5.0 = 9.25

b) Using option payoff table, what will be your profit or loss if Intel is selling for $58 in September?

ANS: Profit / loss = 58 – 50 – 9.25 = -1.25

c) At what stock prices will you break even on the straddle?

ANS: There are two break even prices: 59.25 and 40.75

5. **CH.15.11** The common stock of the P.U.T.T. Corporation has been trading in a narrow price range for the past month, and you are convinced it is going to break far out of that range in the next three months. You do not know whether it will go up or down, however. The current price of the stock is $100 per share, the price of a three-month call option with an exercise price of $100 is $10, and a put with the same expiration date and exercise price costs $7.

a) What would be a simple options strategy to exploit your conviction about the stock price's future movements?

ANS: Purchase a straddle, i.e., both a put and a call on the stock. The total cost of the straddle would be: $10 + $7 = $17

b) How far would the price have to move in either direction for you to make a profit on your initial investment?

ANS: Since the straddle costs $17, this is the amount by which the stock would have to move in either direction for the profit on either the call or the put to cover the investment cost (not including time value of money considerations).

6. ***The Myth of the Rational Market*, Chapter 13 Question 1:** Portfolio insurance helped insulate funds from losses successfully for a number of years. Why did portfolio insurance ultimately disappoint?

   ANS: Too many big traders bought insurance, which meant they were all selling positions at the same time, driving price down steeply and depriving the market of the liquidity needed for the insurance trading strategy to be practical.

7. ***The Myth of the Rational Market*, Chapter 13 Question 2:** If stock market returns were in fact normally distributed, what would be the likelihood of a 22.5 percent decline that occurred on Oct. 19, 1987?

ANS: The probability was of the order of 10 to the -160 power, or an event that could be expected to happen once every couple billion years.

8. ***The Myth of the Rational Market*, Chapter 13 Question 3:** Observers such as Nassim Taleb argue that widespread use of risk management techniques by investors wound up increasing market systemic risk. Why might this be so?

   ANS: If fund managers used like risk models, they would all be trying to sell assets when recent events suggested that market risk had increased.