Risk Analysis Practice Problems
Spring 2012

Problems in the book (Chap 13, pp. 457-460): #1, 2, 3, 4, 5, 7, 9, and 10.

1. PB&J Corporation hopes to implement a new production technology next year. The probability of the technology being ready to implement by then equals 0.75, and it would increase profits by $2 million. If the technology is not implemented, the corporation expects to lose $600,000. What is the expected change in next year's profit for PB&J?

2. Cabal Inc. could increase its profits by $100,000 next year if it changes the work rules in its plant. However, if it does so, it faces a 20 percent chance of a labor action that could result in a loss of $600,000. What is the expected increase in profits to Cabal by changing its work rules?

3. The Deming Company must determine whether or not to add a new product line. If the new product line is a success, the firm will increase its profits by $1 million; if it is not a success, its profits will decrease by $0.5 million. Deming's managers feel that the probability is 0.6 that the new product line will be a success and 0.4 that it will not be a success.
    a. If Deming's managers are risk neutral, should they add the new product line?
    b. How would you determine whether they are risk neutral?
    c. What is the expected value of perfect information to them?

4. A newspaper publisher in a small town must decide whether or not to publish a Sunday edition. The publisher things that the probability is 0.7 that a Sunday edition would be a success and 0.3 that it would be a failure. If it is a success, he will gain $200,000. If it is a failure, he will lose $100,000.
    a. Construct the decision tree for this problem, and use it to solve the problem, assuming that the publisher is risk neutral.
    b. What is the expected value of perfect information?
    c. How would you go about trying to determine whether the publisher is in fact risk neutral?

5. A Tuscon restaurant owner must decide whether or not to expand his restaurant. He thinks that the probability is 0.6 that the expansion will prove successful and 0.4 that it will not be successful. If it is successful, he will gain $100,000. If it is not successful, he will lose $80,000.
    a. Construct a decision tree for this problem, and use it to solve the problem, assuming that the restaurant owner is risk neutral.
    b. Would the restaurant owner's decision be altered if he felt that the probability of a successful expansion is 0.5 instead?
    c. Would the restaurant owner's decision be altered if he felt that the probability of a successful expansion is 0.7 instead?
    d. What value of the probability that the expansion will succeed will make the restaurant owner indifferent between expanding and not expanding the restaurant?

6. The utility function of the president of the Howe Company can be represented by the following equation:

$$U = 10 + 2M$$

where U is utility, and M is monetary gain (in thousands of dollars). He has the opportunity to invest $25,000 in a small electronics firm. He believes there is a 0.5 probability that he will lose his entire investment and a 0.5 probability that he will gain $32,000.

a. If he makes the investment, what is his expected utility?
b. Should he make the investment?
c. Would the above answers change is he is risk averse with utility, $U = \sqrt{M}$?