Individual Assignment #1

General Instructions

You are to work strictly individually on this assignment; you should not communicate with anyone about this assignment until after it has been submitted by all. Read the assignment entirely, including the instructions at the end, before starting to work. Clearly justify all your answers.

Due date: The assignment is due on Friday 12 April, 3:30pm.

What to turn in: Please submit one Excel file containing all your work, as detailed below.

How to turn in your work: Submit your work on BlackBoard by clicking on "Submit Assignment" at the bottom of the left pane menu. If you submit your work multiple times, only your last submission will be considered.

Selling with Forward Contract or on the Spot Market

A farmer faces two uncertainties regarding the revenue from selling his crop. First, the yield of the crop is uncertain: the harvest could produce a large crop of 10,000 tons or a small crop of 6,000 tons, with equal probability. Second, the spot market price at the time the crop will be sold can be high at $180 per ton, or low at $120 per ton. If the crop is large, the probabilities that the market price will be high or low are 50/50. If the crop is small, there is a 70% chance that the market price will be high.

To manage the price risk, the farmer can choose to sell the crop now with a forward contract at a price of $150/ton.

a) Construct a decision tree for the decision to sell all the crop forward or sell all the crop on the spot market. Based on expected value, what is the best alternative?

b) Consider a put option that will enable the farmer to sell the crop on the spot market at a strike price of $140 when the prevailing spot market price is known. Based on expected value, what would the farmer be willing to pay for this option?

For the remaining questions, you will ignore the put option discussed in part (b) and assume that the farmer has an exponential utility function for money with a risk tolerance coefficient of $200,000.

c) Based on this risk tolerance, is it better to sell forward or on the spot market? What is the minimum forward contract price acceptable to the farmer?

d) Between selling all the crop forward, selling all on the spot market, and selling half of the crop forward and half on the spot market, which does the farmer prefer?

e) If the farmer has a choice, what percentage of the crop should he sell forward?

Instructions. *Prepare an Excel file with two worksheets: one sheet for questions (a) and (b), another sheet for questions (c)-(e). For each question, type text somewhere on your Excel sheet to clearly explain or justify your answer. Clearly identify your answers by question number, so that we do not have to guess where to find them in your Excel sheet.*

To incorporate the risk tolerance in question (c), you can duplicate the decision tree you built for question (a). For this, right-click the sheet tab and select "Move or Copy…" to duplicate the entire worksheet. Copying and pasting a decision tree from one sheet into a new blank sheet will not work; you need to duplicate the entire worksheet containing the decision tree.

Submit a single Excel file containing two worksheets (one for a-b, the other for c-e).

---------- END OF INDIVIDUAL ASSIGNMENT ----------