

Take-home Practice Opportunity 9

Due date: November 29, 5:00 p.m.

Hedging Price Risk with Futures Markets

1. In your own words (i.e., in a manner that you would explain it to someone who has not taken this course) explain how local price risk can be hedged using futures markets?
2. Suppose that you are a Montana farmer growing spring wheat. You intend to sell the wheat to local elevators after it's harvested, but you don't know the price you will be quoted by the elevator at the time of sale (many things can change in the span of several months). It costs you \$5.50/bu to produce the wheat and you are only interested in earning a profit on your product (that is, you're not interested in using the futures market to speculate on prices). Respond to the following:
  - (a) What position would you take in the futures market to offset local price variability risk? Why?
  - (b) What is the lowest futures contract price you would need to observe in order to guarantee a per bushel profit?
  - (c) Suppose that in May you take a position on a September futures contract that is priced at \$8.50/bu. Explain what you would do in September just before the contract expires.
  - (d) Assume that futures and local prices converge (are exactly the same in September). Calculate your per bushel profits *in the local* and *in the futures* markets if the price in September was one of the following (construct a table to summarize your results):
    - i. \$4.50/bu
    - ii. \$6.75/bu
    - iii. \$8.50/bu
    - iv. \$9.25/bu
3. (*Hedging with yield variability*) Consider the scenario in problem (2). In addition to the given information, you know that you operate a 2,500 acre farm that, on average, yields 30 bushels per acre. However, there is also yield risk, and you

know that you typically observe production on 2,200 of the 2,500 acres. You are risk averse and wish to hedge as much risk as possible. Additionally, you wish to sell your wheat in November, rather than September. Respond to the following:

- (a) How much wheat (in bushels) do you expect to produce?
  - (b) How much wheat can you hedge using futures markets? Is there any wheat that will not be hedged?
  - (c) How many futures contracts will you need to establish?
  - (d) What position would you take in the futures market to offset local price variability risk? Why?
  - (e) Given that you want to sell the wheat in a local market in November, which futures contract month will you choose? Why?
  - (f) Explain what you would do just before the contract expires in order to offset your futures contract obligations.
  - (g) Assume that you have enough liquid assets to cover any margin calls. Calculate your per bushel profits *in the local* and *in the futures* markets if the price in November was one of the following (construct a table to summarize your returns in the local market, the futures market, and overall):
    - i. Local: \$4.50/bu; Futures: \$5.25/bu
    - ii. Local: \$5.75/bu; Futures: \$6.20/bu
    - iii. Local: \$8.15/bu; Futures: \$8.50/bu
    - iv. Local: \$8.75/bu; Futures: \$9.25/bu
4. You are a feedlot operator that purchases feeder cattle. You will purchase 2,000 head of feeders in August, and each feeder is on average 700 lbs. You will raise these cattle to a weight of 1,100 lbs. and the variable feed costs are \$0.60 per pound of weight gain. Feed acquisition has been forward contracted and, therefore, feed price will not change. It will take four months to raise the cattle to weight and you will sell them in December. Assume that all of the cattle will be raised to weight.

You wish to hedge both the input (feeder cattle) price and the output (fed cattle) price. The current feeder cattle futures contract is trading at \$1.45/lb. and the fed cattle futures contract is trading at \$1.30/lb. You will purchase feeder cattle at a stockyard for the established price and you will sell the fed cattle to a local processing plant at the going local market price. Respond to the following:

- (a) What are the contract specifications for feeder and for fed cattle? That is, how many pounds are contracted using a futures contract?

- (b) How many pounds of fed cattle do you expect to produce with the acquired feeder cattle? What is the expected net revenue (profit) if current conditions do not change?
- (c) How much (in pounds) of the feeder cattle can you hedge? How many contracts will be required?
- (d) How much (in pounds) of the fed cattle can you hedge? How many contracts will be required?
- (e) What positions would you take in the futures market to offset local price variability risk for feeder cattle and for fed cattle? Why?
- (f) Explain what you would do in just before the contracts expire in order to offset your futures contract obligations.
- (g) Calculate your net profits *in the local* and equity *in the futures* markets for the following price scenarios:
- i. Local feeders: \$1.05/lb; Futures feeders: \$1.10/lb Local fed: \$0.95/lb; Futures fed: \$0.90/lb.
  - ii. Local feeders: \$1.10/lb; Futures feeders: \$1.20/lb Local fed: \$1.05/lb; Futures fed: \$1.05/lb.
  - iii. Local feeders: \$1.45/lb; Futures feeders: \$1.45/lb Local fed: \$1.35/lb; Futures fed: \$1.30/lb.
  - iv. Local feeders: \$1.55/lb; Futures feeders: \$1.60/lb Local fed: \$1.40/lb; Futures fed: \$1.25/lb.