

Name: _____

AAE 322
Homework 2

DUE: Feb 19, 08

Use the information below to answer the following questions.

It is Feb. 15. You manage an ethanol plant and buy corn to make ethanol. The plant produces 4.2 million gallons of ethanol per month. You can make 2.8 gallons of ethanol from 1 bushel of corn under the current technology. A corn futures contract is for 5,000 bushels and an ethanol futures contract is for 29,000 gallons. You have the following information about the markets:

- 1) The current corn cash price is \$4.92 per bushel.
- 2) The current ethanol cash price is \$2.10 per gallon.
- 3) May corn futures are currently trading for \$5.08 per bushel.
- 4) July corn futures are currently trading for \$5.22 per bushel.
- 5) April corn basis for the last three years was -0.03 (3 years ago), -0.13 and -0.14 (1 year ago).
- 6) March ethanol futures are currently trading for \$2.16 per gallon.
- 7) April ethanol futures are currently trading for \$2.15 per gallon.
- 8) May ethanol futures are currently trading for \$2.13 per gallon.
- 9) It will cost you 3.5 cents per month per bushel to store corn after it is purchased.
- 10) Your futures broker charges you \$50 to trade a futures contract (this includes getting in and back out of the market).

Questions:

- 1) Has corn basis been getting weaker or stronger the last couple of years? How do you describe the relationship between ethanol futures prices for different months?

The corn basis has been getting weaker for the last three years. The ethanol futures market is inverted because the distant month price is lower than the nearby month price.

- 2) You want to guarantee profits for April. What actions should you take in the futures market? How many futures contracts do you need?

I have to buy May corn futures and sell May ethanol futures today to lock in the profit for April.

I need 1.5 million bushels of corn to produce 4.2 million gallons of ethanol.

Corn futures : 1,500,000 bushel / 5,000 bushel / contract = 300 contracts
Ethanol futures : 4,200,000 gallon / 29,000 gallon / contract ≈ 145 contracts

3) What is the current expected cash price for April corn?

$$\begin{aligned}\text{Expected April cash price} &= \text{current May futures price} + \text{expected April basis} \\ &= \$5.08 + (-\$0.1) \\ &= \$4.98\end{aligned}$$

4) Should you buy corn today for the ethanol you are going to produce in April? How much will you make or lose if you buy today for your April corn needs?

$$\begin{aligned}\text{Cost to buy today and store until April} &: \text{current cash price} + \text{storage cost for 1.5 month} \\ &= \$4.92 + \$0.035 * 1.5 \\ &= \$4.9725\end{aligned}$$

I should buy corn today and store it until April at \$4.9725 per bushel and it is cheaper than the expected April price (\$4.98) by \$0.0075 per bushel. (\$11,250 for 1.5 million bushels of corn)

5) If you hedged for corn today, and in April the May corn futures price is \$5.28 per bushel, and the cash price is \$5.16, will you be better off or worse off than you expected? Why?

$$\begin{aligned}\text{Expected April basis} &= -\$0.1 \\ \text{Realized April basis} &= \$5.16 - \$5.28 \\ &= -\$0.12\end{aligned}$$

I will be better off because the basis is weaker than expected.

6) If you hedge for ethanol today, and in April the May ethanol futures price is \$2.25 per gallon, and the cash price is \$2.21, will you be better off or worse off than you expected? Why?

I am not sure because I have no information on the expected April basis for ethanol. I need a basis history to determine this year's expected basis. If basis ends up weaker than expected, I am worse off, if stronger than expected, I am better off.

7) I am a corn farmer, and I sell you corn. I am currently offering you a forward cash contract for 15,000 bushels of corn for April delivery for \$5.02. Is it a good deal? Why or why not?

$$\begin{aligned}\text{Expected cost to a hedge} &: \text{Corn May futures} + \text{expected April basis} + \text{brokerage fee} \\ &= \$5.08 + (-\$0.1) + \$0.01 \\ &= \$4.99\end{aligned}$$

The forward contract is not a good deal because it is asking higher than you would expect to pay if you hedged.

- 8) The initial margin requirement for corn is \$1,350. Maintenance margin is \$1,000. If you hedge today and May corn is \$5.05 per bushel on Mar 1, and \$4.95 on Mar 15, explain the cash flow on your margin account between Feb 15 and Mar 15?

DATE	PRICE	ACTION	MARGIN	ACCOUNT BALANCE
Feb 15	\$5.08	Buy May corn	Deposit \$1,350	\$1,350
Mar 1	\$5.05			\$1,200
Mar 15	\$4.95			\$700

There will be a margin call on Mar 15 because the account balance goes below the maintenance margin. I should deposit \$650 per contract to meet the initial margin requirement.

- 9) It is the morning of Apr 1. There is news that the biggest oil export country decides not to export for one month. What would you expect to happen in the markets and on your profit? (Assume you are hedged)

The supply curve of oil will shift to the left and the price will increase in short run. Since the ethanol is a substitute for gasoline, the increased demand for ethanol will make its price rise. The ethanol plant will have a higher profit from selling ethanol at a higher price if they did not hedge. Meanwhile, the plant may pay more for corn because the transportation cost will increase. IF that happens, it could cause the profits to decrease.

In the problem above, the ethanol plant takes a short position in the ethanol futures market to hedge its downside risk. If the ethanol futures price surges in short run due to the news, the ethanol plant will have to deposit more margin, which results in a negative cash flow in the margin account.

- 10) If you are a speculator, are your margin requirements for corn and ethanol futures contracts likely to be higher or lower than the ethanol plant? Why?

Usually the speculators have higher margin requirements than hedgers do. Hedgers take opposite positions in cash market and futures market, so a loss from the futures market can be covered by a profit from the cash market. However, the speculators do not take any activity in the cash market. They are considered riskier than the hedgers. This is why the speculators are required to pay higher margins.