

## ***Futures and Options Script***

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This is all an interactive exercise. You cannot learn futures and options by only listening or reading – you need to pick some numbers, some market scenarios, and see what happens. The example worked is from the summer of 2018. The reason is that summer seems to be the best window for cow-calf producers hedging fall calf sales: sometime in June-August purchasing put options to protect calf sales in October-November. Other systems require changing the marketing window and animal weights but this is the most common system encountered.

First, we need to start with basis.

**Basis Information – Fed & Feeder Cattle & Corn Basis Data.pdf** – Basis data is provided for fed steers and heifers first. Corn basis is included last. Feeder cattle are in the middle.

9-10 cwt steers for different markets on two pages, next 8-9 cwt steers, last is 4-5 cwt steers, and then similar for heifers. Colorado markets are included in each.

**Feeder Cattle Basis Figures.xls** – summarizes Colorado and Kansas in pictures. These pictures are from the Basis Information resource. Small animals are priced at a premium to heavier animals and this is what we see. Likewise, there is a strong seasonal pattern. Everyone wants calves in the spring and has calves to sell in the fall.

In what month do you market cash cattle? Assuming October and November but can work alternative months. And at what weight? Assuming 500-600 pounds but can work alternative weights. Similarly, working only steer examples.

Feeder cattle basis for Colorado is at the bottom of the first page of each 2-pages for the different steer/heifer and weight combinations. There are two pages for each weight and for steers versus heifers. Colorado markets are very thin in June, July, and August so ignore those calendar months. That is why Kansas is included in the spreadsheet. Turn to 5-6 cwt steers: the average basis for Colorado in October is \$19.23 for the past five years. Colorado cash feeder cattle prices for 5-6 cwt steers were on average \$19.23/cwt higher than the CME Feeder Cattle contract price for the OCT contract in the calendar month of October. A more reasonable and conservative number may be +\$15.00/cwt. (All the following spreadsheets use \$10.00 for a nice round easy to use number.)

The Colorado cash feeder cattle prices used for each month are weighted averages across all auction and direct trade markets in Colorado so the number is indicative of NE Colorado and SE Colorado to a much lesser extent. What is the price in your market relative to the Brush, CO market? What is a San Luis Valley price relative to Brush? What is a mountain price relative to Brush? My guess is minus \$3.00. (What is the cost per loaded mile of a truck? \$4.50. How

many animals on the truck? About 100. Weight of animals? About 500 pounds. Miles? 200-400. So the cost per cwt of animal is \$1.80-\$3.60/cwt.)

So we could use +\$10 for basis for a nice round basis number. This would include some freight. And then again the Feeder Cattle Specifications have changed to 50# heavier animals relative to all the data in the Basis Information resource. Let the audience decide.

Understanding basis is critical to understanding what goes wrong with hedging.

Second, let's work some hedges.

**Examples Futures Hedge - Date.xlsx** – use tabs: livestock sell hedge, livestock sell hedge (2), and livestock sell options.

Input Green cells, look at Orange cells for results of calculations, and producer actions are Red letters. The steps are 1, 2 and 3 large colored cells: (1) make a decision, (2) evaluate an outcome if the market moves down, and (3) evaluate an outcome if the market moves up.

On June 8, 2018 the OCT Feeder Cattle futures contract was trading at about \$148. I use this because this lets the OCT option with a \$148 Strike Price be At-the-Money. This makes some options stuff easier.

We use the \$148 futures price, the basis discussed, and then need to pick a futures gain and a futures loss. A futures gain – when the contract is sold – is a price drop. A futures loss is a price rise.

Ask the producers to pick some numbers. If OCT is \$148 in the summer then how much can it go up between now and October/November and how much could it drop? Talk through some scenarios. Use some charts. There are several years OCT/NOV contract from spring each year to the last trading day. There are several big drop years, several flat years, and several price rise years. Price changes of -\$15 and +\$15 are reasonable.

The top of the two outcome periods ignores animal numbers, weights, and numbers of futures contracts. The top assumes everything balances out. Right below this simple assumption are input cells for number of head and average weight. You can also change with animal weights, numbers of head, and the number of contracts to trade. The feeder cattle contract size is 50,000 pounds so do not change that.

The tab Livestock Sell Hedge looks at a \$15 price drop and a \$15 price rise. After looking at the two outcomes with no basis error. Try some example basis errors. For example, it was assumed that basis would be +\$10/cwt. Suppose basis was actually the average +\$19.23/cwt. This is a positive +\$9.23/cwt basis error. The smallest basis in the resource was +\$2.27/cwt. This is a cash market that is weaker than expected and basis error is -\$7.73/cwt. Plug that amount in and look at the results. You cannot break the spreadsheet and you are worried about breaking your bank amount so try some different numbers and be reasonable.

Next, go to the Livestock Sell Options tab.

The put option prices are in **Section18\_Feeder\_Cattle\_Put\_Options\_20xxxxxx.pdf** and **Examples Options Calculations & Graphs - Date.xls**. Call options have a similar named document. Different options can be used but for this example OCT is being used. There is also a file **Section03\_Agricultural\_Futures\_20xxxxxx.pdf** with the futures prices.

An OCT Feeder Cattle Put option with a \$140 strike price would cost about: \$3.00/cwt. This premium is multiplied by 500 cwt (or 50,000 pounds) so the cost of the option \$1,500. This is an out-of-the-money option. These options tend to be cheaper than other choices.

If the market stays flat or increases then the \$140 option on OCT feeder cattle declines in value and eventually is worthless. The producer would just let it expire worthless.

If the market drops below the \$140 strike price then the option has as much value at expiration and the difference between the market price and the strike price. The producer can exercise the option, which converts it to a futures position and then offset the futures position, or sell back the option to obtain its value. Selling back the option usually has smaller commissions costs.

After the options example tab the producers are going to be curious. The example will be clear as mud. So open **Examples Options Calculations & Graphs - Date.xls**. These are some very detailed options examples with numbers, scenarios and pictures.

Be sure to ask participants to vote. What price floor do you like? What do you think is going to happen between this summer and the fall? How certain of you are about that? Do this repeatedly. If participants are optimistic then low/cheap price floors are “best” and if participants are pessimistic the high/expense price floors are “best.” But really there is no best for everyone.

The Options Values tab has the futures and options prices for the OCT and NOV Feeder Cattle futures contracts. Options have intrinsic and time value. Discuss a couple of examples.

First, Puts are the right but not the obligation to sell. You can buy the right to sell and sell the right to sell. Calls are the right but not the obligation to buy. You can buy the right to buy and sell the right to buy. Muddy – examples of where the money goes are coming.

If I buy the right to sell at \$140 and pay \$3.00 for it, then if the market stays at \$140 that right will not be worth anything. Likewise, if the market goes up the right to sell below the market is not worth much. But if the market falls below \$140 then my right to sell at \$140 takes on value. The current premium cost of \$3.00 is a reflection of the risk that the market will fall.

The “Work Put-Call” tab shows where the money goes when a put is traded and when a call is traded and when the market moves up or down. A put and a call with a \$148 strike price is used because the put and call for the same strike price is traded.

The “Graph Put” and “Graph Call” tabs show a picture of the work and the data for the graphs is on the “Graph Put-Call Data” tab.

Next, “Work Floor” does the calculations for three different put options when the market goes up, goes down, and stays the same. There is also a picture for this work: “Graph Floor” and a tab that does the work for the graph.

Make the participants vote as to which option they like best – or would they rather run with the cash market and have all that risk or hedge with futures and have just basis risk.

Last, there is a “Work Fence” tab where the middle put option is chosen – \$144 Put Strike Price – and the producer also sells a call option. Selling a call option places a ceiling on the price received but the received premium from selling the call is revenue for the producer. Selling calls with two different strike prices are considered: \$156 and \$160. So the OCT Feeder Cattle futures contract must increase above these levels before the calls lose the producer money.

There is a picture of the two fence strategies – along with the middle put option or price floor. Ask the producers to vote. Do they like the opportunity offered by the fences, floors, hedge or cash market?

Tally the votes...