

# Using Futures Markets to Manage Price Risk for Feeder Cattle

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## Introduction:

Price volatility in feeder cattle markets has greatly increased since 2007. While there are many reasons for the increase in price volatility, some of the more common factors include volatility in grain and fed cattle prices, variability in weather, and an increased dependence on exports. Price risk is becoming another factor that cattle producers must learn to manage, just like they would anything else in their operation. Along with this volatility is an increase in producer interest in learning more about strategies to manage price risk for feeder cattle.

2012 was the type of year that price risk management would have saved feeder cattle producers a great deal of money. The August 2012 CME© Feeder Cattle Futures contract opened in the upper \$130's, but pushed above \$160 in the early spring. Then it actually came back to near \$160 twice in the early summer, providing producers multiple opportunities to capitalize. Around the second week of June, as worsening corn yield prospects drove corn prices higher, feeder cattle futures plummeted back into the \$130's.

Many producers purchased calves in the spring of 2012, based on strong summer and fall feeder cattle price expectations. These expectations made those calf purchases very expensive. As feeder cattle futures fell by more than \$20 per cwt (\$160 on an 800# feeder steer<sup>2</sup>), so did profitability expectations of those backgrounders and stocker operators planning to sell feeder cattle in the fall. Some took futures positions to protect themselves from this downside price risk, but many did not. The purpose of this publication is to introduce cattle producers to the futures market as a risk management tool and provide an illustration of how hedging with this tool could provide them with downside price risk protection.

## The Basics:

The futures market is a market where commodity prices are established to be delivered at a later date. In its simplest form, one can think of futures prices as price expectations. Specifically, the contract specifications are for 50,000 lbs of medium and large frame #1-2 steers, with an average weight between 650 and 849 lbs (Figure 1). So, the January CME© Feeder Cattle Futures contract can be thought of as an expectation for feeder cattle of this specification in January. As information enters the cattle futures market, it is likely that the prices of CME© Feeder Cattle Futures contracts will change in response to the new information. Futures markets are very

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<sup>2</sup> A \$20 per cwt change in the price of an 800 lb steer is \$160 per head (\$20 x 8 cwt)

efficient and respond to new information quickly. CME© Feeder Cattle Futures contracts are traded in eight months of the year including, January, March, April, May, August, September, October, and November.

Producers also need to understand that local prices and futures prices for 750 lb feeder steers will be different. This difference is commonly referred to as “basis”, the price differential between local prices and futures prices<sup>3</sup>. CME© Feeder Cattle Futures contracts are cash settled to actual feeder cattle sales at major markets in a twelve state area including Colorado, Iowa, Kansas, Missouri, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wyoming. A group of 750 lb feeder steers in Kentucky will likely sell for less than the current futures market contract because Kentucky cattle typically sell for less than cattle in those twelve states. This difference is primarily due to transportation costs from Kentucky to major cattle feeding areas. However, local supply and demand conditions can also impact basis. Producers need to keep this basis in mind as they consider what feeder cattle futures prices mean for Kentucky prices. While feeder cattle futures and Kentucky feeder cattle prices will be affected by similar factors and tend to move in the same direction, there will usually be a difference between local price and futures price.

**Figure 1. Feeder Cattle Futures Contract Specifications**

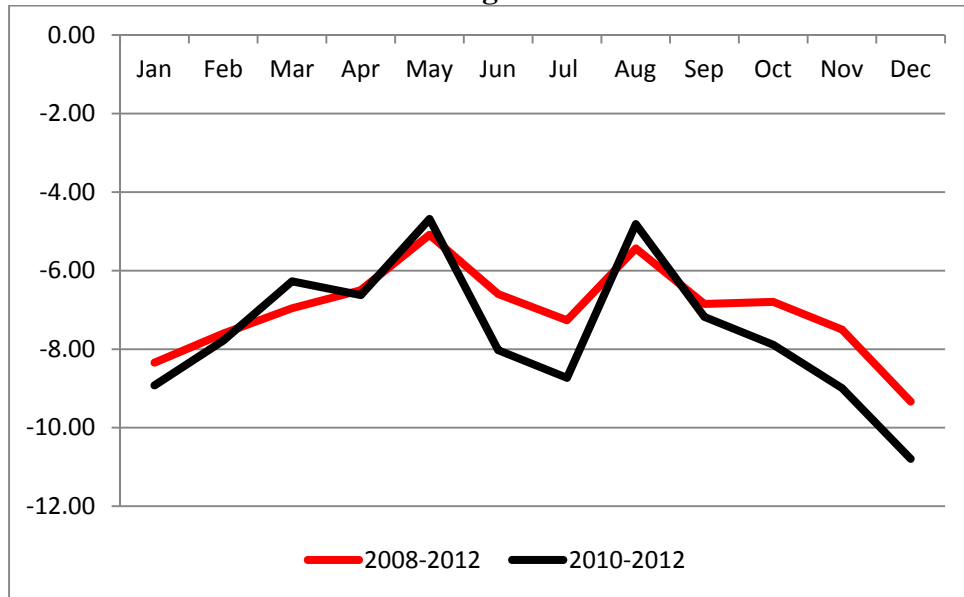
- 50,000 lbs of feeder cattle
- average weight: 650-849 lbs
- medium-large frame #1 and medium-large frame#1-2 steers
- contract months: Jan, Mar, Apr, May, Aug, Sept, Oct, Nov
- cash settled to the CME© Feeder Cattle Index, a 7 day weighted average of feeder cattle prices in CO, IA, KS, MO, MT, NE, NM, ND, OK, SD, TX, and WY

While feeder cattle futures are for feeder steers weighing around 750 lbs, basis can be estimated for any weight, sex, breed, or type of cattle. For example, heifers are well established to bring lower prices than steers at the feeder cattle level, so basis for heifers will tend be weaker than basis for steers. Similarly, if we estimate basis for 850 lb feeder steers in Kentucky, it is likely to be weaker than 750 lb feeders due to the price slide effect on the additional 100 lbs. All these factors, as well as local demand and supply conditions, should be considered when producers estimate basis for feeder cattle.

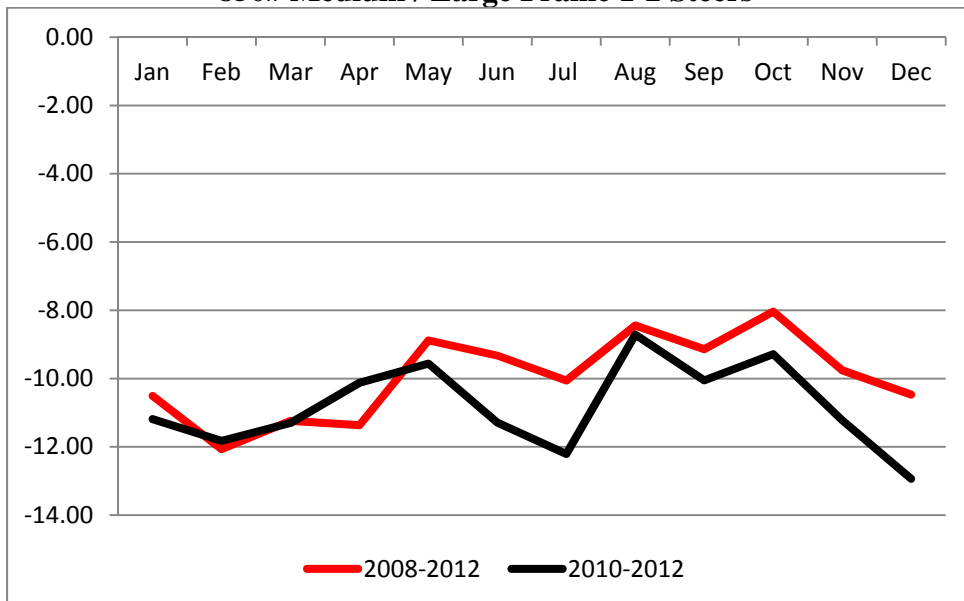
Figures 2 and 3 show historical basis for Medium and Large Frame 1-2 Kentucky feeder steers weighing 750 lbs and 850 lbs respectively, over the last 3 and 5 years. While basis will certainly be affected by current conditions and vary for each producer and each group of feeder cattle sold, these figures should provide some indication of seasonal basis patterns and tendencies in recent years. Generally speaking, basis tends to improve from winter as we move towards spring and weaken from summer into winter. An understanding of basis allows feeder cattle producers to move from a basic understanding of the futures market, to an understanding of implications for feeder cattle prices in Kentucky.

<sup>3</sup> Basis = local or cash price minus futures price

**Figure 2: Monthly Kentucky Basis Estimates  
750# Medium / Large Frame 1-2 Steers<sup>4</sup>**



**Figure 3: Monthly Kentucky Basis Estimates  
850# Medium / Large Frame 1-2 Steers<sup>5</sup>**



<sup>4</sup> Data from Kentucky auctions was made available from USDA-AMS and the Kentucky Department of Agriculture Livestock and Grain Market Report. Monthly feeder cattle futures were available through CME Group and databased by the Livestock Marketing Information Center.

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### **Buying and Selling Futures Contracts:**

Futures contracts can be bought and sold like most anything else. Participants make money if the sale price exceeds the purchase price. Buying a futures contract is considered a “long” position and selling a futures contract is considered a “short” position. If a long futures market position is taken at \$140 per cwt. and later offset for \$144 per cwt. the owner of the contract would have made \$4 per cwt. or \$2,000 total on the contract before commission and fees.

One of the challenging concepts for many is that futures contracts can be sold first and bought later to close the contract. While this is challenging for some, it is not that different from selling something now and delivering it later. For example, a backgrounder could sell a group of feeder cattle in September, but agree to deliver them at a specified weight in November. In that case, the backgrounder is obligated to deliver the feeder cattle in November. In the case of selling a futures contract, that position must later be offset by buying that same contract back. It is also worth noting that futures contracts can be opened and closed without actually delivering cattle.

It may be easier to understand this concept if one considers how it might compensate a cattle producer in a down market. Let’s say that I am currently backgrounding a group of steers that I plan to sell in January. I am worried that between now and January, the price of those feeder cattle will go down. If this happens, I sell the cattle on a softer market and lose some money on the sale of the actual cattle. However, if I sell (short) a futures contract, I can make money on that contract if the futures market goes down because I can buy it back at a lower price. As long as the futures market and the Kentucky feeder cattle market move largely together, my futures gain compensates me somewhat for the loss on the actual sale of the cattle.

Of course, this works both ways. If the market rises between now and January, I sell my cattle for a higher price on the local market but this is largely offset by a loss on the futures contract. I have to buy back that futures contract at a higher price. Regardless of what the market does, I net about the same price when I consider what I sell the cattle for plus or minus my gain or loss on the futures market, assuming I was properly hedged.

### **Margin Accounts:**

Some of the first questions that producers have about using the futures market often involve margin accounts and margin calls. When a producer takes a position in the futures market, whether a short or long position, a margin account will be required to establish the position. The margin account works like an investment. If the producer loses money as a result of changes in the futures price, that loss will be taken from the margin account. This ensures that the individual on the other side of that position receives the money they are due. Similarly, if the market moves in the other direction, the gain is deposited into the margin account.

Sometimes margin is confused with commission. As was said earlier, the margin account works like a deposit. The money in the account belongs to the individual; it is only there to cover any losses that may occur. Conversely, when a producer takes a futures position they will pay a commission to someone who executes the trade for them. While commission and fees will vary, producers can usually expect to pay between \$50 and \$100 per trade when working through a broker, which works out to something like \$0.10-\$0.20 per cwt on a 50,000 lb feeder cattle contract. When buying or selling a futures contract, commission is an expense and that money is

gone. However, money placed in a margin account is only lost if futures market movements result in a loss on the position. Here is an example:

Let's say a producer decides to sell a CME® Feeder Cattle Futures contract at \$140 per cwt. The total contract value is \$70,000 (500 cwt. x \$140), but the producer will only be asked to put up a portion of this value. To make the math easy, let's assume the producer is asked to deposit \$3,000 into his or her margin account. If the price of the contract rises to \$142 the next day, the producer has lost \$1,000 on that position and this loss will be taken from the margin account; the new balance is \$2,000. If the balance in the margin account falls below a minimum threshold required, the producer will be required to send additional money to bring the account up to maintenance levels. This is what is known as a margin call. Initial margin requirements and maintenance margin levels will be different from broker to broker.

### **Using Futures to Protect Against Declining Prices - The Straight Hedge:**

The straight hedge is the simplest price risk management strategy involving the futures market. The idea behind the straight hedge is that by taking opposite positions in two markets that generally move together, a gain in one market can offset a loss in the other. Consider the case of the backgrounder who purchases calves in the spring, plans to graze them through summer and fall, and sell the calves in November. Once those calves are purchased, a large portion of the total expenses of the backgrounder have been incurred. The backgrounder is concerned that the feeder cattle market will fall before the sale date.

Because the Kentucky feeder cattle markets and the feeder cattle futures market tend to move together, the futures market can provide an opportunity for the backgrounder to protect themselves from downside price risk. If, while owning those calves, the backgrounder sells a feeder cattle futures contract, the backgrounder will make money on the futures contract when the feeder cattle futures market moves downward. This gain will work to offset selling feeder cattle on a weaker local market. Of course the opposite is also true. If the backgrounder sells a futures contract and the feeder cattle futures market moves higher, they lose money on the futures contract, but benefit from a stronger cash market when they sell their calves locally. It may help to walk through a scenario to drive this concept home.

Let's assume that it is July and a summer grazer is currently grazing a group of steers that were purchased in the spring. They plan to sell the feeder cattle in early November and the November feeder cattle futures contract is trading for \$140 per cwt. Basis has been tracked over time, market conditions considered, and the backgrounder estimates that they will sell 850# steers this fall for about \$12 under the November board; this suggests a November price for their steers in Kentucky around \$128 per cwt. The cattle are doing well and he / she feels confident that they can make an acceptable profit based what the futures market is suggesting the likely prices will be for calves this fall. Rather than risk the potential changes that could occur in the market between July and November, they chose to go ahead and protect their November price in July, by selling a November feeder cattle futures contract.

**Possibility #1** – prices stay about the same. If the futures market is still trading for around \$140 when the feeders are sold in November, and the -\$12 basis estimate was close, the grazer is likely to sell the steers for around \$128 per cwt. Further, since they sold a November feeder

cattle futures contract in July at \$140, they will offset (buy back) that contract at the same price. Effectively, they will have no gain or loss on their futures contract and be left with a net price for their calves around \$128 per cwt. It is worth noting that they would still be out whatever commission had been paid back in July and would have had to maintain a margin account during that time.

**Possibility #2** – prices fall. If the futures market weakens by November, the grazier will make money on the futures contract, but sell their cattle for a lower price in November. For example, if the market moves downward from \$140 to \$130, the grazier would make \$10 per cwt (\$85 per head) on the futures contract. However, rather than selling their cattle for \$128, the cattle are now likely sell for \$118 (November futures price of \$130 minus \$12 basis). When the futures gain (\$10 per cwt) is added to the selling price for the calves (\$118 per cwt), the producer still nets \$128 per cwt for the calves.

**Possibility #3** – prices rise. If the futures market strengthens by November, the grazier will lose money on the futures futures contract, but sell their cattle for a higher price in November. For example, if the market moves upward from \$140 to \$150, the grazier would lose \$10 per cwt (\$85 per head) on the futures contract. However, rather than selling their cattle for \$128, the cattle are now likely sell for \$138 (November futures price of \$150 minus \$12 basis). When the futures loss (\$10 per cwt) is subtracted from the selling price for the calves (\$138 per cwt), the producer still nets \$128 per cwt for the calves.

Table 1 shows net price outcomes as futures prices change from selling a futures contract at \$140. Note that regardless of what the price ends up being, the producer still nets \$128 per cwt for the cattle that are sold. In one sense, the producer is indifferent once the futures position is taken. However, that is an oversimplification for two primary reasons. First, note that basis was assumed to be \$12 under. While (\$12) may be a reasonable basis estimate for these cattle, there is some uncertainty as to what the final basis will be, which will impact the net price. Secondly, even if the net price ends up exactly as expected, the producer has been out the use of their margin money during that time. In situations where market prices rise, the producer is making margin payments as the market moves upward. However, they don't get the benefit of selling the cattle for a higher price until the cattle are sold in November. So, the producer is out the interest on that money during the background period and may have to take out an additional operating loan. For this reason, it is very important that backgrounders be in regular communication with their lenders during the backgrounding period.

**Table 1: Net Price Outcomes Under Various Futures Price Scenarios  
(Initially Selling Futures @ \$140)**

| Futures Price | Expected Basis | KY Price | Gain / Loss on Futures | Net Price |
|---------------|----------------|----------|------------------------|-----------|
| \$160         | (\$12)         | \$148    | (\$20)                 | \$128     |
| \$150         | (\$12)         | \$138    | (\$10)                 | \$128     |
| \$140         | (\$12)         | \$128    | \$0                    | \$128     |
| \$130         | (\$12)         | \$118    | \$10                   | \$128     |
| \$120         | (\$12)         | \$108    | \$20                   | \$128     |

### **Using Put Options to Protect Downside Price Risk:**

By selling futures (the straight hedge), the producer locks in a price for their cattle in advance, subject to basis risk. In doing this, the producer essentially accepts the current market and gives up any potential to benefit from rising prices. However, they also eliminate downside price risk. Some producers prefer a strategy that provides some downside protection, while also leaving some upside potential. Put options are one such strategy.

Purchasing a put option gives the producer the “right”, but not the obligation, to sell a futures contract at a predetermined price. The one who purchases the put option will only choose to exercise this right if it is in their best interest to do so. When a put option is purchased, a premium is paid in exchange for the right to sell at a specified price. The price at which the put buyer has the right to sell is called the “strike price”.

For example, rather than selling a futures contract for \$140 per cwt., the producer might instead choose to buy a put option with a strike price of \$136. This would give the producer the right to sell November futures at a price of \$136 per cwt. Let’s say for the sake of discussion that the premium for this option was \$3 per cwt. The producer will pay that \$3 regardless of what happens in the market. If the cattle market declines significantly while the producer owns the put, the value of the put will increase. Then the put can be sold, working to compensate the producer for the fact that the cattle are worth less than expected.

By purchasing the put option, the producer has effectively set a price floor of \$121 per cwt. It is important to understand where this \$121 price floor comes from. First, the strike price on the put option is \$136 per cwt; as the futures market falls below this level, the producer capitalizes on increased value of the put. Second, if the market does reach \$136, he / she still must consider the (\$12) basis. And finally, regardless of the outcome, the producer will be out the \$3 in premium ( $\$136 - \$12 - \$3 = \$121$ ). Let’s walk through the same scenario as before, except rather than selling a futures contract for \$140, the producer instead purchases a put option with a \$136 strike price for \$3 per cwt. We will walk through the same possible market outcomes as before, except we will have two scenarios where price falls by varying amounts.

**Possibility #1** – prices stay about the same. If the futures market is still trading for around \$140 when the feeders are sold in November, and the -\$12 basis estimate was close, the grazer is likely to sell the steers for around \$128 per cwt. Further, since the producer purchased a \$136 put and the market is still trading at \$140, the put most likely has no value. However, they still spent \$3 on the put option so their net price for the calves will end up being \$125 ( $\$128 - \$3$ ). As before, it is worth noting that they would still be out whatever commission had been paid back in July.

**Possibility #2** – prices fall by a small amount. If the futures market weakens by a small amount between July and November, the grazer will sell their cattle on a slightly softer market in November, but may not receive any benefit from their put option. For example, if the market moves downward from \$140 to \$137, the grazer would most likely sell their cattle for \$125. However, their \$136 put most likely has very little value (if any at all) since it the market is still above the strike price. So, the producer will receive \$125 for their cattle and still pay \$3 in premium, leaving them with a net price of \$122 per cwt.

**Possibility #3** – prices fall by a large amount. If the futures market weakens considerably between July and November, the grazier may be able to make money by exercising or selling back their \$136 put. But, they will sell the cattle on a considerably softer market. For example, if the futures market moved down to \$125 per cwt, the producer would most likely sell their cattle for around \$113 per cwt. However, since they purchased a put with a \$136 strike price, they could exercise (or sell back) that put to make \$11 per cwt. Of course, they would still be out \$3 per cwt for the cost of the premium. But in this case, the net price for the calves would be the price floor that was discussed earlier of \$121 ( $\$113 + \$11 - \$3$ ) per cwt.

**Possibility #4** – prices rise. If the futures market strengthens between July and November, the grazier will not make money on their put option but will get the benefit of selling the cattle on a stronger market. For example, if the market moves upward from \$140 to \$150, the \$136 put would certainly be worthless and the grazier would have still spent \$3 per cwt in premium. However, rather than selling their cattle for \$128, the cattle are now likely sell for \$138 (November futures price of \$150 minus \$12 basis). In this case, the net price for the calves would be the sale price of \$138, minus the \$3 premium, for a net price of \$135 per cwt. Notice that with a put option, a price floor is in place, but producers can still benefit from a rising market.

Table 2 shows net price outcomes as futures prices change from purchasing a put option with a \$136 strike price for \$3 per cwt. Note that regardless of what the price ends up being, the producer has a price floor in place of \$121, but still receives a higher net price as the market rises. As with straight hedge, basis remains an unknown factor that can impact net price. But, there is no potential for margin calls when a put option is purchased. The most the producer can lose is the initial premium spent on the option, in this case \$3 per cwt.

**Table 2. Net Price Outcomes Under Various Futures Price Scenarios  
(Purchase Put Option with \$136 Strike Price)**

| Futures Price | Expected Basis | KY Price | Premium Cost | Gain on Put | Net Price |
|---------------|----------------|----------|--------------|-------------|-----------|
| \$160         | (\$12)         | \$148    | \$3          | \$0         | \$145     |
| \$150         | (\$12)         | \$138    | \$3          | \$0         | \$135     |
| \$140         | (\$12)         | \$128    | \$3          | \$0         | \$125     |
| \$130         | (\$12)         | \$118    | \$3          | \$6         | \$121     |
| \$120         | (\$12)         | \$108    | \$3          | \$16        | \$121     |

**The Challenge of Being 100% Hedged:**

Generally, the scenarios discussed in this publication have assumed that the cattle being marketed were 100% hedged. In other words, discussion and tables presented were based upon the premise that the producer had an exactly 50,000 lbs of feeder cattle to sell and therefore a single futures contract or put option provided the perfect amount of price protection (or some precise multiple of these quantities). However, producers will almost always be hedged at something less than, or greater, than 100%. While it adds some complexity, it is worth discussing the implications of this for producers.



If feeder cattle are less than 100% hedged, this simply means that the number of lbs covered by futures positions is less than the numbers of lbs that the producer plans for sell. From a risk management perspective this means that gains or losses on futures markets will not perfectly offset gains or losses on cattle sold locally. If 50% of the cattle were covered by a futures position, then the gain or loss on the futures position would offset only half of the gain or loss from the movement in the local cattle market. In reality, 50% of the cattle were price protected and the other 50% were not.

It is also worth noting that in cases where producers are less than 100% hedged, they will not be indifferent about market direction. If a producer is less than 100% hedged through selling a futures contract, he or she will be better off in a rising market as they benefit from the rising market prices on all the cattle they sell, but only see this offset on the smaller proportion that were covered by the futures contract. In cases where prices are declining, producers will be worse off because they will sell all their cattle on the softer market, but only gain on the smaller proportion that were covered by the futures contract. Some producers may choose to be less than 100% hedged as part of their risk management strategy. In declining markets, they have downside protection on a portion of their cattle, but in rising markets can still see positive price benefits.

There will also be situations where producers may be slightly more than 100% hedged. In a situation such as this, producers are essentially speculating on the portion of the futures position in excess of the lbs of feeder cattle they plan to sell. When a producer is over-hedged, their gain or loss on futures more than compensates them for their gain or loss in the local market as they have more lbs of futures position than they do cattle. Once again, they are not indifferent about market direction. In the case of a producer that is over hedged by selling a futures contract, they will actually be better off in a declining market as they will make more money on the futures position than will be lost on the local market. Conversely, in a rising market their loss on the futures position will be greater than the price gain seen on the local market.

While being highly over hedged is not a good risk management strategy, one can imagine situations where it may make sense to be slightly over hedged. Consider a producer with 40,000 lbs of feeder cattle to sell that chooses to protect them through a 50,000 lb feeder cattle futures contract. While this producer is clearly over hedged by 10,000 lbs, it may make more sense to speculate on 10,000 lbs of a futures position, rather than speculate on 40,000 of feeder cattle. An alternative would be to join with other producers that need less than one futures' contract and essentially take a portion of a futures' position. Regardless, it is crucial that producers think through these decisions and understand the implications of their risk management strategies.

### **Conclusions and Implications:**

The purpose of this publication has been to provide an introduction to how the futures market can be used to manage downside price risk for feeder cattle. Two basic price risk management strategies were discussed, selling futures (the straight hedge) and setting a price floor by purchasing a put option. Both have advantages and disadvantages that should be considered by producers.

Selling a futures contract is a strategy that essentially sets both a floor and a ceiling on possible prices. The producer has very solid downside price risk protection as they make money on their short futures' position as prices fall. However, they also give up potential upside gain as they will lose on that futures position as prices rise. Producers should also make plans for margin calls as they can become quite large during time periods of rapidly rising prices and stay in regular communication with their lenders.

Put options establish a floor, but not a ceiling, on possible prices. Many producers find put options attractive because they provide downside risk protection, but still allow for some upside potential in rising markets. Producers also like put options because they are not subject to margin calls. However, put options can be expensive and it is also worth noting that the price floor set through purchasing a put option will be lower than the price that can be locked through selling that same futures contract due to premium costs and the difference between the current futures' market and the strike price of the put option. However, many producers find put options to be a very suitable middle-of-the-road strategy between selling a futures contract and doing nothing.

Regardless of what strategy producers choose to employ, the most important thing is that they consider the price risk that they face. Their individual situations with regards to financing and self-insurability will dictate how much price risk they can likely bear. Thinking through this, and choosing a strategy that makes sense for them, is becoming increasingly important in today's highly volatile commodity markets.