Futures Market Training  
By Bob Cropp

Introduction

A major change occurred in 1981 with the federal dairy price support program. Rather than supporting farm level milk prices between 75 and 90 percent of parity, the level of milk surpluses and associated government costs became the criteria for determining the support price. The result was declining support prices for the years that followed. The support price, which was $13.10 per hundredweight in 1981, was reduced to $10.10 by 1990. The 1996 FAIR ACT increased the support price to $10.35 on April 4, 1996 with the provision that the support price would be decreased by $0.15 per hundredweight each January 1 with the termination of the support program the end of 1999. As can be seen in chart 1, since 1990 these relatively low support prices have kept the farm level milk prices above support but at the cost of considerable price volatility. No longer has the federal price support program provided much of a safety net to farm level milk prices. Market forces rather than the federal price support program are determining farm level milk prices. Rather small changes in either milk supply or demand result in rather large changes in farm level milk prices.

While congress this year may consider extending the support price beyond 1999, it is not likely that support will return to levels that provide a strong safety net to milk prices and reduce the price volatility experienced the past few years. It is very clear that dairy producers need to become acquainted with price risk management tools both for the output side of their operation, milk price, and the input side, feed costs. The tools available include hedging on the futures market, the use of options in futures, and cash forward price contracts. This paper will discuss these price risk management tools and under what market environment these tools may be the best strategy.

Where to begin?

The use of price risk management tools begins with your personal and farm business goals. These goals establish a milk price level and profit level a producer desires to achieve. Each producer needs to evaluate their own financial situation, what level of price risk exposure they can manage, and what are their short run and long run goals. This will enable a producer to establish a marketing plan. The steps to a price risk management strategy or marketing plan are as follows:

1) Establish your personal and business goals.
2) Determine your cost of milk production. This should be your past, current and projected costs. Changes in feed costs can substantially change the cost of production. This is why using price risk management tools to protect feed costs is as important as protecting the price of milk. You may wish to break down your costs as cash costs that must be covered in the short run and total economic costs.
3) Based on your personal and business goals and the cost of production, establish a price/profit objective. For example, your marketing strategy may be, if the futures market offers me only a $12.00 per hundredweight price, I will lock in 35 percent of my milk production, but if the futures market offers me $14.00, I will lock in 75

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percent of my milk production. This price/profit objective puts meaning or logic behind your marketing strategy.

4) **Know your basis.** The basis is the difference between your mailbox milk price and the BFP futures contract price. The BFP futures contract price is only a base price used by your milk buyer to establish its pay price to you, your mailbox price. So in order for you to determine whether or not a futures contract price will allow you to meet the established price/profit objective, the basis needs to be added to the BFP futures contract price or options strike price. Basis will vary from year to year and from month to month. Changes in milk composition, milk quality, and competitive conditions among milk buyers can change the basis. It is best that a producer compares month by month their mailbox price to the BFP for the past three years and then calculates and average basis for each month. Because the basis can change, futures and option are not perfect price risk management tools. But since basis changes far less than the potential change in milk prices, futures and options can reduce the risk of changes in the milk price.

5) **Study the markets.** Ask the question, are futures prices being offered at a historical high, low or about the average? What is the probability that prices will be higher or lower than these futures prices? Depending upon the level of futures prices and the probability of prices strengthening or declining may influence which type of market strategy a producer chooses. A producer needs to decide what is a "good" milk price based on their goals and historical milk prices.

6) **If the futures, options, or cash forward price contract meets your price/profit objective, act upon your marketing plan.** A wait and see attitude does not work well. Remember, if your marketing strategy/plan is based on solid personal and business goals, than the outcome from your marketing strategy is also solid regardless whether milk prices increase or decrease. If your objective is to get the highest milk price rather than price risk management, then your marketing plan is bound to fail. Your marketing strategy should be to achieve your business and personal goals.

7) **Stick to your marketing plan.** This is related to number 6. Not following your marketing plan is no better than having no plan. Don't fall into the trap, if I had only done this or have not done this, I would have gotten a higher milk price. But do evaluate your marketing plan periodically to see if it should be modified. Changes in your dairy operation may warrant a change in your marketing plan.

**Evaluating when to use a specific marketing strategy**

Some will argue that a producer should stick to one marketing strategy. Doing something else is speculation and not price risk management. Price risk management is not price speculation. But sticking with the proper use of futures, options or cash forward price contracts is far from the horror stories about producer loosing their farm because they speculated on the futures market. Quite the contrary. Proper use of these price risk management tools reduces the risk of a producer loosing their farm or having difficulty cash flowing. There is nothing inherently wrong with sticking with futures, options or cash forward price contracts, but under different market environments one of these tools will out perform the others. Some producers may use a combination of these tools. Actually all marketing strategies are combination strategies. Seldom, if
ever would a producer protect 100 percent of their future milk production. So leaving a portion of milk production unprotected and using one of these marketing tools is a combination strategy. Don't fall for a line from your broker, “you don't need to know all there is to know about futures and options, let me take care of your marketing decisions”. While the relationship between a producer and a broker needs to be one of trust and brokers will provide very useful information, the producer needs to make the final marketing decision. The decision must relate back to the producer's personal business plan. As knowledge and experience builds, a producer may develop more sophisticated marketing strategies.

To illustrate which price risk management tool or strategy to use, let’s assume the following: A producer on March 10th wishes to protect the price of June milk production. The following options are open: Hedge by selling a June BFP futures contract at $12.75, buy a BFP June PUT option at a strike price of $12.50 and at a premium of $0.21, or sign a cash forward price contract with a milk buyer that has a “base” milk price of $12.70. Also assume that the June basis is $1.00, that is, the milk buyer normally pays a mailbox price $1.00 above the BFP in June. Remember the BFP futures and options are not delivery contracts, but rather cash settle contacts. The contracts are cash settled against the announced BFP by USDA. Since the BFP for a given month, like June, is announced on or before the 5th of the following month, July, the BFP futures and options expire the day before the BFP is announced. In this example, June futures and options expire on July 2nd (July 4th is a holiday so the BFP is announced on July 3 and the June BFP contract ends on July 2). We will also assume that these futures prices meet the producer's price/profit objective. The results of each of the three strategies under declining and rising milk prices are illustrated in the charts below. The basis is assumed to remain unchanged. In reality the basis is likely to change some and the net outcome will vary by the change in the basis, that is, basis risk. If the basis strengthens (widens) the net price outcome is better than what was projected by the amount the basis strengthens. If the basis weakens (narrows) the net price outcome is lower than what was projected by the amount the basis weakens.

**Strategy One:** Hedging by selling a June BFP futures contract. Hedging will establish a specific price, that is, the net price is the same whether milk prices decrease or increase as shown below.

<table>
<thead>
<tr>
<th>Date</th>
<th>Cash milk price</th>
<th>BFP futures price</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/10</td>
<td>Project June mailbox price: $12.75 + $1.00 = $13.75</td>
<td>Sell June BFP futures @ $12.75</td>
<td>$1.00</td>
</tr>
<tr>
<td>7/3</td>
<td>Milk plant pays for June milk @ $13.00</td>
<td>Cash settle the June BFP futures @ $12.00 announced BFP</td>
<td>$1.00</td>
</tr>
<tr>
<td>Change</td>
<td>Loss: $0.75</td>
<td>Gain: $0.75</td>
<td>$0.00</td>
</tr>
<tr>
<td></td>
<td>Net price: $13.00 cash price + $0.75 futures gain = $13.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7/3</td>
<td>Milk plant pays for June milk @ $14.50</td>
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<td>$1.00</td>
</tr>
<tr>
<td>Change</td>
<td>Gain: $0.75</td>
<td>Loss: $0.75</td>
<td>$0.00</td>
</tr>
<tr>
<td></td>
<td>Net price: $14.50 cash price - $0.75 futures loss = $13.75</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Strategy Two:** Buying a June BFP PUT with a strike price of $12.50 at a premium of $0.21. Buying a BFP PUT option gives the producer the right but not the obligation to see a June BFP futures contract at the strike price anytime prior to expiration of the June PUT.
This strategy will establish a price floor; that is, it insures your milk price from falling below a certain level. In this case the established floor for June milk is:

\[
\begin{align*}
&\text{$12.50$ strike price} \\
&- \quad \text{\$0.21 premium paid} \\
&\text{\$12.29} \\
&+ \quad \text{\$1.00 basis} \\
&\text{\$13.29 floor price for June}
\end{align*}
\]

If the June BFP is announced at $12.00, less than the $12.50 strike price, the June BFP PUT option is exercised. This means that the producer now has the right to sell a June BFP at the $12.50 strike price and cash settle it at the announced June BFP. The net result is as follows:

- Sell June BFP futures contract @ \$12.50
- Cash settle at announced June BFP \$12.00
- Futures gain = \$0.50
- Minus premium paid \$0.21
- Net gain = \$0.29
- Net price: \$13.00 June cash price + \$0.29 futures gain = \$13.29

If the June BFP is announced at $13.50, higher than the $12.50 strike price, the June BFP PUT option expires worthless. The net result is as follows:

Net price: \$14.50 June cash price \sim \$0.21 PUT premium paid = \$14.29

**Strategy Three:** Sign a cash forward price contract for June milk with a milk buyer at a base price of $12.70. Like hedging a cash forward price contract establishes a specific price. Some milk buyers are using PUT options to establish a floor base price for producers.

If the June BFP is announced at $12.00, the net June milk price will be:

- Net Price: \$12.70 base price + $1.00 = \$13.70

If the June BFP is announced at $13.50, the net June milk price will be:

- Net Price: \$12.70 base price + $1.00 = \$13.70

A summary of the net June milk price under these three alternative risk management tools is shown below.

<table>
<thead>
<tr>
<th>If June BFP is announced at</th>
<th>If has hedged @ $12.75 June BFO</th>
<th>If had bought a June BFP Put with a strike price of $12.50 at a $0.21 premium</th>
<th>If had signed a cash forward price contract @ $12.70 June base price</th>
</tr>
</thead>
<tbody>
<tr>
<td>$12.00</td>
<td>$13.75</td>
<td>$13.29</td>
<td>$13.70</td>
</tr>
<tr>
<td>$13.50</td>
<td>$13.75</td>
<td>$14.29</td>
<td>$13.70</td>
</tr>
</tbody>
</table>
As can be readily seen, when milk prices fall, hedging results in the highest net price. The cash forward contract price is usually slightly lower because the milk buyer assumes the costs associated with risk management and reflects this cost in a base price lower than the BFP futures price. In the above example, $0.20 per hundredweight. The PUT option has the lowest net price because of two factors. One, the strike price selected is normally below the BFP futures settle price. The producer is assuming some price risk by establishing a floor price. Two, a premium is paid for the strike price. But if milk prices increase, the highest net price is experienced with buying a BFP PUT option. Both hedging and cash forward price contracts have locked in a specific price. PUTs on the other hand allow the producer to take advantage of rising prices minus the premium paid. Buyers of PUT options hope to loose the premium because this means that milk prices have improved. This is like car insurance. One does not hope to have an accident so they can collect against the car insurance premium paid.

From the above example what can be said about which is the best strategy to use? There is no exact science to this. Again, this is a personal decision based on the personal business and marketing plan. But in general the following may be said:

If futures prices are settling at historical highs and the probability of prices declining is much greater than increasing, hedging or cash forward price contracts would appear to be a better strategy over using PUT options.

If futures prices are settling at historical lows and the probability of prices increasing is much greater than decreasing further, buying a PUT option appears to be the best strategy. Buying a PUT option will protect against any further deterioration if one is wrong and prices do actually decline further and at the same time leaving open the opportunity for better prices. It is seldom attractive to lock in relatively low prices with hedging or cash forward price contracts.

If futures prices are settling near the historical average, the best strategy is less obvious. Nevertheless, if the probability is greater for prices to decline than increase, hedging or cash forward contracts over buying a PUT option may be considered and vice versa.

Another consideration in deciding between hedging and buying a PUT option is the premium for the PUT. When futures are settling at relatively high levels and/or the probability is rather great that prices may decline further, the premiums on PUTs at reasonable strike prices normally are relatively high, that is $0.40 per hundredweight or higher. Premiums at this level are rather expensive price insurance. But yet, if major declines in milk prices are very high, producers may still wish to pay these high premiums. However, remember when prices decline hedging nets a higher price than PUTs because of no premium.

Another consideration is margin money. A deposit of margin money is required when hedging is used. Margin money is around $500 to $600 per 200,000 pound BFP futures contract. If futures price increase and the value of the futures contract increases above this initial margin deposit, the producer will receive margin calls for additional deposits. When prices increase substantially like they did the fall of 1998, margin calls can become rather large. With buying a PUT there are no margin calls. This is because the buyer of PUT has not made ant commitment, but rather only bought the right to sell a futures contract.

A real advantage of cash forward price contracts is their flexibility and simplicity. Milk buyers offering cash forward price contracts allow contracted milk volumes at levels less than the 100,000 pounds BFP contract on the New York Board of Trade or the 200,000 pounds contract offered on the Chicago Mercantile Exchange. These smaller volumes also allow smaller producers to participate. Producers can also contract at more than one or two milk prices for a given month.
The milk buyer pools the contracted milk volumes from various producers into a futures contract. Further, some milk buyers are offering a base milk price for an entire year. Futures or options are only for a given month. And finally, with cash forward price contracts a producer does not have to establish an account with a broker, pay broker commissions directly and worry about margin calls.

The following futures and PUT options opportunities were available on February 18, 1999:

- June BFP futures settled at $11.52
- June BFP PUTs were:
  - $11.25 strike price at $0.36
  - $11.50 strike price at $0.48
  - $11.75 strike price at $0.62

The $11.52 June BFP futures price is below the 1988-98 average June BFP, but because June is four months distant from February and market conditions can change, the probability of milk prices changing is still fairly great. This greater price uncertainty results in relatively high premiums for PUTs. A producer may still consider a $11.25 strike price at $0.36 over hedging, but perhaps not higher strike prices.

**Advanced Market Strategies**

In addition to the traditional hedging and buying PUT options, producers can use more advanced strategies. These advanced strategies are considered when the market conditions have changed from when the initial strategy was set. The advanced strategy may allow the producer to improve the final net price by adjusting the initial strategy. However, caution needs to be exercised because if the anticipated change in market conditions do not materialize, the net outcome does not improve over the initial position, in fact, because of additional transaction costs, the net outcome will be lower.

A brief description of the more common advance strategies follows:

1) **Roll up to futures:** This is a good strategy to consider when there has been a rally in the BFP futures, but now there is a very good probability that prices will decline. The producer has already established a floor mailbox price by buying a PUT option. The producer could sell the BFP PUT and recover part of the premium paid and at the same time sell a BFP futures contract at this higher settle price. The producer has established a higher floor price with the hedge. But if producer is wrong and prices increase instead of declining, the hedge will now also serve as a price ceiling because hedging locks in a specific price.

2) **Roll up to a PUT:** This is a strategy to consider after a rally in the BFP futures, the price outlook calls for possible further price declines, but yet a producer wants to be cautious. The producer has bought a BFP PUT. This strategy allows the producer to buy another BFP PUT at a higher strike price to establish a higher floor price. The original PUT may be sold at some premium. If the producer is wrong and prices increase, the net price will now come out lower because of the premium cost paid on two PUT options.

3) **Cash contract and now buy a CALL option:** Consider this strategy after the price outlook has turned from bearish to bullish. The producer has a base milk price established with a cash forward price contract. The producer now buys a CALL option, which gives the producer the right to buy a BFP futures at a strike price. This strategy retains the floor price but allows the...
producer to gain from a price increase. When prices increase the CALL option is exercised, meaning that a BFP PUT is bought at the lower strike price, and cash settled at the higher announced BFP. A gain on the futures can be added to the cash forward contract price. But if prices do not increase, the net result is now lower because of the premium paid for the CALL.

4) **Sell a CALL:** A strategy to consider when there has been a sideways movement in the BFP futures, neither increasing or decreasing and premiums are relatively high. The producer can collect a good premium to add to the cash milk price. But if prices do increase, the buyer of the CALL will exercise and the producer (seller) will need to take an opposite position on the futures market (sell a BFP futures at the strike price and cash settle at the higher announced BFP) and thereby experience a loss. In fact, there is no limit on losses experienced with this strategy. The higher prices increase, the greater the loss experienced by the producer.

5) **Short fence:** This strategy maybe considered when the price outlook is slightly bullish and premiums for options are relatively high. Here the producer would buy a PUT first, and second, sell a CALL. This strategy establishes both a ceiling milk price and a floor milk price. This strategy protects a price/profit range.

6) **Roll down futures to a PUT:** This strategy may be considered when a producer had originally hedged, but the BFP futures have since gone down. The producer is of the opinion that prices have bottomed out and are about to increase. The producer gets out of the futures contract (buying a BFP futures) and then buys a BFP PUT to establish a floor price in case they are wrong and milk prices continue to decrease. A profit is realized from offsetting the original hedge. If prices do increase, the net price will be higher than the original hedge. But if prices decrease, the net price may turn out lower.

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**Summary**

Milk price uncertainty and price volatility inexperienced in recent years is likely to continue. There are alternative risk management tools to manage this price risk. Dairy producers need to establish a marketing plan in order to make sound decisions in the use of these risk management tools. These are personal decisions. Marketing strategies will differ among producers.