Futures Contracts and Other Instruments to Manage Price Risk

By

Bob Cropp

Introduction

Managing price risk is still a relatively new topic for dairy farmers. For about 40 years, 1950-90, the federal dairy price support program provided a rather high safety net under farm level milk prices and consequently the milk price risk was minimal. Further, until fairly recent, in the Upper Midwest most dairy farmers raised most of the feed they fed to dairy cows. But now we are finding larger dairy herds, and some of the smaller herds, purchasing more of their feed, especially grains and protein sources. The result is greater profit risks from changing out-of-pocket feed costs. The 1990 Farm Bill moved federal price and income support policy towards more market orientation. An even greater move to market oriented farm policy occurred with the Federal Agricultural Improvement and Reform Act of 1996 (the 1996 Farm Bill). With market oriented farm policy comes greater price risk for both farm level milk prices and grain prices (feed cost).

The impact of changing federal dairy price support policy is well illustrated in chart 1. As can be seen, from 1970 to 1990, the price support program was a major factor in the level of milk prices. The Minnesota-Wisconsin Price (M-W)\(^2\) was close to the support price from 1970 until 1990. When farm level milk prices were declining the CCC under the federal dairy price support program purchased butter, nonfat dry milk and cheese at specified prices and thereby kept farm level milk prices at or near the support level. When farm level milk prices began to rise the CCC sold back to the commercial market these products and thereby dampened the increase in farm level milk prices. Through these actions by the CCC farm level milk prices were kept rather stable during the year and between years (with an upward trend through 1981). The support price, which was $4.66 per hundredweight in 1970, increased to $13.10 by 1981. With this rapid increase in the support price, dairy producers responded with increased milk production that led to a major milk surplus situation. Increased government costs for the support program and a growing milk surplus resulted in Congress moving the support program off of a parity formula. The support price was reduced several times during the next ten years to $10.10 by 1990. The current support price is $10.05. These support levels are below the total per hundredweight milk production costs of dairy farmers and below the cash costs of many. The result is farm level milk prices have remained above support since 1990, but have been highly volatile and uncertain.

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2 The M-W was revised and changed to the Basic Formula Price (BFP) in May 1995.
This milk price volatility and uncertainty is not going to change. The 1996 Farm Bill provides for complete termination of the federal dairy price support program the end of 1999. The feed grain program is being phased down through 2002. Hence, dairy producers will continue to experience both farm milk price risks and feed price risks. To protect profit objectives, dairy farmers need to consider price risk management tools. These include hedging milk and feed prices on the future market to protect a specific milk or feed price, the use of options to set a floor under milk prices or a ceiling on feed costs, and or the use of cash forward price contracts for future milk to be sold and feed to be bought. In this paper, I will concentrate on protecting farm level milk prices.

Dairy Futures and Options

While futures contracts have been around for more than 130 years, dairy futures are new. The Coffee, Sugar & Cocoa Exchange (CSCE) began offering cheese and nonfat dry milk futures and options in June 1993. A grade A raw milk futures and options contract was offered by the CSCE December 1995 and by the Chicago Mercantile Exchange (CME) January 1996. Both exchanges started butter futures and options in 1996, and BFP futures and options in 1997.

There is a very strong correlation between cheese prices and the BFP. Dairy producers can therefore use the cheese futures and options to protect their milk price, and some have. But because dairy producers don’t make cheese and because delivery of cheese is required, if the futures contract is allowed to mature, dairy producers were reluctant to use cheese futures and options. This was the reason for the exchanges to introduce the
Grade A raw milk contract. But this contract also requires delivery, if contracts mature. Further, the futures price for this contract did not always represent the BFP price, but rather during periods of tightness in the fluid (beverage) market, it represented the value of spot shipments of Grade A milk from the Upper Midwest to the Southeastern deficit fluid milk markets. Thus, the basis risk was great reducing the effectiveness of this raw milk contract as a risk reduction tool. The BFP futures contract is a cash settle contract. Interest in this contract is growing and appears to be the preference by producers for protecting farm level milk prices. Two reasons for this are, dairy farmers can relate their milkbox milk price to the BFP, and second, the BFP is cash settled at the announced BFP for the month. With these two characteristics the basis risk is minimal.

The CSCE offers a 100,000 pound BFP futures and options contract. The CME offers a 200,000 pound BFP futures contract and both a 200,000 and a 50,000 BFP options contract.

Before a dairy producer uses dairy futures and options they need to have a marketing plan, that is, a bases upon which to decide when to use futures, options or to cash forward contract. Such a marketing plan includes the following:

1) Determination of the cost to produce milk. This will involve feed costs and thus, the use of futures; options or cash forward contracts need to be considered for protecting the cost side.

2) Establish a milk price/profit objective

3) Know your basis, the difference between your mailbox price and the BFP

4) Study the markets; the probability of milk prices strengthening or weakening.

5) If futures prices meet the price/profit objective, decide the percentage of future milk production to hedge, to protect with options, or to cash forward contract.

6) Stick to your plan.

Regardless of the year, there usually is an opportunity to protect a future milk price at a reasonable level with dairy futures or options. This is because dairy futures respond to market information as do grain and other futures. The futures market may over react in the short run to this market information. For example, information that El Nino may lead to wet weather in the West resulting in herd health and milk production problems can cause a strong run up in dairy futures prices. Information that future milk production may be more favorable would have the opposite effect. If a dairy producer has a marketing plan in place, and the futures price reaches the levels of their price/profit objective, they can then act and hedge or use an option to protect that price/profit objective.

Table 1 shows as of June 4, 1998, the range of pricing opportunities a dairy producer had available to protect the price of future milk production. This range was as much as $2.40 per hundredweight for the June BFP futures contract ($13.25-$10.85). No one knows when the BFP is at is low or high. Therefore, dairy futures cannot be used to always achieve the highest milk price. But if a dairy produce has a solid marketing plan and uses

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3 Basis is the cash milk price minus the futures price. The change in the basis affects the net outcome of the hedge.
dairy futures or options to protect a price/profit objective, he/she will realize a good milk price even though it may or may not be the highest milk price. Remember, the objective of dairy futures and options is to protect a good milk price so the risk from low milk prices being received and resulting cash flow problems are reduced, not to achieve the highest milk price. Further, a dairy producer should never uses dairy futures or options to protect prices for all of their future milk production, but perhaps only 20 to 60 percent, depending upon the attractiveness of the futures price. This leaves the remaining percentage of production to receive the actual market price for the month. By this strategy, the average milk price received for the year should protect a favorable price/profit objective. Further, with this strategy there will be times when futures prices are not at a level that meets the producer’s price/profit objective and futures and options should not be used.

Table 1. Range in BFP Future Contract Prices on the CSCE as of June 4, 1998

<table>
<thead>
<tr>
<th>Contract month</th>
<th>High Price</th>
<th>Date for the High</th>
<th>Low Price</th>
<th>Date for the Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>$13.30</td>
<td>½3/98</td>
<td>$11.45</td>
<td>8/26/97</td>
</tr>
<tr>
<td>February</td>
<td>$13.29</td>
<td>2/11/98</td>
<td>$11.50</td>
<td>9/9/97</td>
</tr>
<tr>
<td>March</td>
<td>$12.96</td>
<td>2/12/98</td>
<td>$11.65</td>
<td>8/26/97</td>
</tr>
<tr>
<td>April</td>
<td>$12.40</td>
<td>2/12/98</td>
<td>$11.60</td>
<td>10/15/97</td>
</tr>
<tr>
<td>May</td>
<td>$12.41</td>
<td>2/11/98</td>
<td>$10.87</td>
<td>5/1/98</td>
</tr>
</tbody>
</table>

The question is often asked, should I use dairy futures contracts and hedge my milk price, or should I purchase a PUT option? Hedging establishes a specific future milk price. If milk prices fall, the lower cash milk price received is offset by the gains on the futures market. If milk prices rise, the higher cash milk price received is offset by losses on the futures market. But options do not establish a specific future milk price, but rather establishes a floor under future milk prices. A dairy producer does not know what future milk prices will be, but wants to protect his/her milk price from falling below a specific level and to be in a position to take advantage of any milk price increases. A PUT option gives the producer the right, but not the obligation to sell a futures contract in the future (the contract month) at a price, called a strike price. The producer pays a premium for that right. Like any insurance program, the more protection that is bought, the higher the insurance premium. For example, a 100 deductible car insurance policy will have a higher premium than a 500 deductible policy. With PUT options, the higher the strike price, the more price insurance is bought and the higher the premium paid. If the cash price of milk falls below the strike price, the dairy producer exercises the PUT option and receives a gain on the futures market to be applied against the lower cash price. If cash milk prices rise above the strike price, the option is allowed to expire and the producer can take advantage of rising milk prices minus the premium paid.

A dairy producer can use CALL options to protect milk prices as well. A CALL gives one the right but not the obligation to sell a futures contract in the future. Here a dairy

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4 If there is time left before expiration of the PUT option, the option may be sold and some of the premium paid recovered.
producer would sell a CALL option at a strike price and receive a premium. A buyer of milk trying to protect against rising milk prices may be interested in purchasing a CALL option. If cash milk prices fall, the buyer of the CALL will not exercise the option and the producer can keep the premium to apply to his/her lower cash milk price. But if milk prices rise, the CALL will be exercised and the producer will need to provide a futures contract to the buyer at the purchased strike price. Because of this, a producer must be cautious in selling CALLS. A strategy may be to use both PUTs and CALLS in some combination. Time does not permit discussing such strategies here.

But back to the question, to hedge or use options? There is no one definite answer. Some brokers are advising dairy producers to only use PUT options. Their logic is that a dairy producer does not know where future milk prices will be, but does know at what level he/she does not want milk prices to fall below. Further, dairy producers are not happy when they are hedged and milk prices rise. They hate to give up the possibility of a higher milk price being received. Using PUT options protects the bottom side and allows the producer to take advantage of rising milk prices.

So PUTs over hedging seems to have the edge. But I don’t believe that is a clear situation. One needs to consider where futures prices are at and what premium one needs to pay for a PUT option. For instances, when BFP futures are trading a relatively high levels, say in the top historical one-third price range, the probability of prices being even higher may be less than the probability of prices falling. In this situation where the probability of milk prices falling are greater than rising, the premium paid for a PUT option at a relatively high strike price is likely to be relatively high simply because of the greater probability that the option will be exercised. When milk prices fall, milk prices under a hedge will net out better than if a PUT option was used. With the hedge the producer receives the specific higher price that was hedged. With PUT options the producer receives the lower floor price (strike price) minus the premium paid. If the opposite situation exists where BFP futures are trading at relatively low levels and the probability of milk prices rising, or at least not going much lower, is greater than falling milk prices, hedging may not be very attractive because one cannot take advantage of any rising milk prices. But a PUT option may be very attractive. A producer does not want to risk milk prices going any lower, but wants to leave the option open to capitalize on any rising milk prices. Since the probability of milk prices rising are greater than falling and therefore, exercising the PUT option is less, the premium paid for the PUT will also be lower. If milk prices do rise, the producer will net out better with a PUT (higher milk price minus the premium), than receiving the specific lower milk price hedged.

Does this mean then that when BFP futures are trading at relatively high levels always hedge with BFP futures contracts and when BFP futures are trading at relatively low levels always use PUT options? That may be a general statement, but it still is not that simple. Recent history on milk prices tells us that where milk prices will peak or reach their low for the year is quite varied and uncertain. Further, when BFP futures are trading in the between level of historical highs and lows, that is more near the average, what do you do? The simple answer is, a producer probably won’t hedge or set a floor under
nearly as great of percentage of future milk production than if BFP futures are trading at relatively high levels. In any of these situations a producer may use a combination of hedging and PUT strategies.

In all of this discussion and the use of a marketing plan it is extremely helpful to view historical BFP prices by the month. I simply use the past 10 years and for each month look at the range in the BFP over these years, the average, the upper one-third BFP prices and the lower one-third BFP prices. Chart 2 shows the low, average, top one-third and high M-W/BFP prices for 1988-97. If BFP futures are trading in the historical one-third high range, that is a very good price and a producer should probably do something, hedge or buy a PUT option. If the BFP futures are trading in the average to upper one-third range, then hedging or PUTs may be used but a smaller percentage of future milk production will be protected. If BFP futures are trading below the historical average or in the lower one-third range, a producer probably should not hedge or buy a PUT option. All of this needs to be combined with the cost of production and market situation and outlook information. There is no magic science here. If there were, dairy futures and options would be a perfect tool. But let me repeat again, with the use of a solid marketing plan, hedging and options for both milk prices and feed costs can protect a very acceptable milk price and profit level. Further, as shown in table 1, the range of trading prices for a given BFP futures contract is rather great. When a trading price reaches the established price and profit/objective and are in a historical good price range, a producer needs to take some action. If he/she waits, the rather favorable pricing opportunity may slip away.
Cash Forward Contracts

The marketing strategy discussions above applies equally to cash forward milk price contracts. A producer still needs to have a marketing plan in deciding when or when not to accept a contract price from a milk plant. Several milk plants are offering cash forward milk price contracts to their producers and more are anticipated in doing so. Most are cooperatives because milk plants that are not cooperatives and are regulated under federal milk marketing orders find it rather difficult in using dairy futures and options to offer cash forward milk contracts to producers. This is because federal milk marketing orders establish minimum producer pay prices. If a contract price should be below that minimum, the milk plant is required to pay the higher minimum price. Dairy cooperatives are not obligated to pay their producer-members this minimum price.

These cash forward milk contracts are for the base pay price. Producers who agree to a contract price receive all premiums and deducts that milk not contracted receives. Some milk plants are offering minimum price contracts with the use of PUT options. Here the producer can take advantage of rising milk prices minus the premium paid by the milk plant for the PUT option.

The advantages of cash forward price contracts over hedging or use of options are:

1) Flexible quantities of milk can be protected. With futures or options contracts rather large quantities of milk are involved. With cash forward contracts, much smaller quantities of milk can be protected.

2) It is much simpler for some producers to pick up the phone and call his/her milk plant for a future milk price than going directly through a broker and set hedges and/or buy and exercise options. Some producers prefer leaving these tasks with their milk buyer.

Summary

Federal farm policy will continue to be very market oriented. This means that dairy farmers will continue to experience price risks for both milk prices received and prices paid for feeds. Futures and options and cash forward contracts are risk management tools that can be effectively used to reduce these price risks and to protect a price/profit objective. To successfully use these tools a dairy farmer needs a solid marketing plan and needs to be knowledgeable about the market situation and outlook.