



# Western Dairy News

For the West, About the West, From the West

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## *Hedging Milk with Futures and Options*

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All dairy managers that are in business 5 years from now will make routine use of price risk management tools. Will you be one of them? The 1996 farm bill changed dairy markets. The security provided by the support program is gone. The 2002 farm bill did not bring them back. Since 1990, when price support levels were lowered substantially, prices have become much more volatile and this volatility is not going away.

Milk prices fluctuate over the year because of seasonal demand and supply fluctuations. Milk prices usually are lowest in late spring and early summer and highest in late fall. Over longer time periods a variety of economic factors determine milk price changes. Recently, prices have been weak because of weak demand for cheese. Milk futures and options can be used to hedge milk prices in order to manage milk price risk.

### Futures Contracts

A futures contract is a contract traded on a futures exchange for the delivery of a specified commodity at a future point in time. The contract specifies acceptable delivery methods and locations, and clearly defines the standards of the commodity such as weight, quantity, quality and form. Futures contracts are available for 200,000 pounds of Class III milk on the Chicago Mercantile Exchange. (A Class IV milk contract is also traded and the ideas behind the examples are the same.) If a futures contract is held open until maturity, it is settled at the announced USDA Class III milk price.

A hedger takes a position in the futures market that is equal and opposite to the position that the individual either has or expects to have in the cash market. This position protects against adverse price movements. The hedger could be a dairy producer desiring to protect the price of milk. The milk producer considering hedging must decide: "How much money is enough money?" If you ask producers this question they will usually answer, "As much as possible." But you know this is not realistic and it is not how businesses operate. During the planning process, the producer must examine all expected expenses, and all expected revenues, and then determine desired and reasonable returns to management, owner labor, and investment capital. Being unrealistic means you routinely don't hit your targets.

### Basis – Or the Mailbox Differential

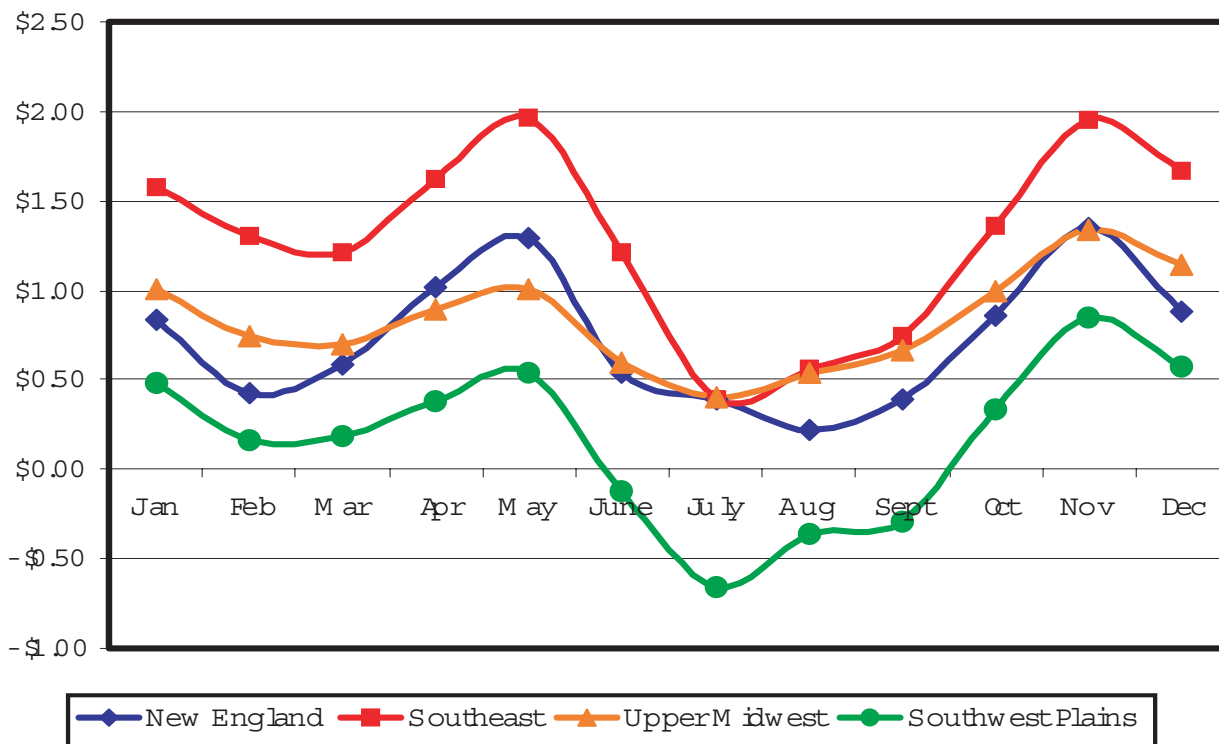
Basis is the difference between the Mailbox Price received by the producer and the USDA Class III market price at the time the milk is sold. Basis accounts for transportation costs, quality differences, local market conditions and milk class utilization. Figure 1 reveals the historical milk basis for different areas of the country. A producer will need to calculate their own basis.

Three important aspects about calculating the basis must be kept in mind: 1) Several years of historical price data should be used to calculate the basis; 2) Basis data used should correspond to the time the hedge is lifted and milk sold; and 3) Basis is seasonal, cyclical, and may trend.

*(Please continue under Hedging, page 2)*

(Hedging, continued from page 1)

Figure 1. Sample of Basis between the Mailbox Price and Milk Futures Contract Price



Cash Settlement

Cash settlement means that at expiration of the contract, the difference between the futures contract price and the USDA Class III price will be settled by a cash transaction rather than actual delivery of the product. (Dollars are as good as milk!) The contract is settled by cash so that milk does not have to be delivered to settle the contract terms.

Margin Call

When a producer opens a hedge account with a broker, that producer is required to put a certain percentage of the value of the contract into a margin account to guarantee financial performance. If the futures market moves against the producer, additional margin money will be required. Likewise, if a profit accrues, money may be with-drawn from the margin account. When the futures position is liquidated, the margin account is used to settle the account.

Hedging Examples

To illustrate a hedge on an upcoming milk sale, assume it is June 1 and the producer is planning for November milk production. Feed and hay prices for the summer and fall are locked in with forward contracts. The manager wants to ensure that milk revenues will cover expected costs through November. The producer finds that the November futures contract closed for the day at \$12.00. Because the producer's November basis averages +\$1.00, he realizes the market is offering him a \$13.00 mailbox price for November. The producer needs \$11.75 per hundred-weight to cover costs in November. The producer decides this is enough money and that the price offered achieves target rates of return for his business. The producer decides to hedge 1,000,000 pounds of his expected November production.

An at-the-money put option will cost \$0.60 per hundredweight. Options are more flexible, but more costly, than futures. They are very much like insurance. The option will allow the producer to escape margin calls but purchasing an option requires the payment of a premium. Through buying put options with a \$12.00 strike price, the producer can lock in a milk price of \$12.40 (12.00 strike +1.00 basis -0.60 premium) for the hedged portion of milk production. Table 1 contains two examples of hedging with futures contracts and two examples of hedging with options. The examples illustrate returns with and without the hedges. Example 1 illustrates a futures hedge when prices fall, while Example 2 illustrates a futures hedge when prices rise. Examples 3 and 4 do the same thing with options.

(Please continue on page 3, under Hedging)

*(Hedging, continued from page 2)*

Table 1. Hedging with the futures and options contracts.

Assumptions	Per Cwt.	
Costs of milk production	\$11.75	
Average November basis	\$1.00	
November futures contract on June 1	\$12.00	
November put option strike price	\$12.00	
November put option premium on June 1	\$0.60	
Hedging with futures contracts	Example 1	Example 2
November futures contract sold (June 1)	\$12.00	\$12.00
November futures price (December 5)	\$10.00	\$14.50
Net on hedge	+\$2.00	-\$2.50
December Class III price	\$10.00	\$14.50
Basis	+\$1.00	+\$1.00
Mailbox price	\$11.00/cwt.	\$15.50
Net mailbox price received*	\$13.00/cwt.	\$13.00
Returns over costs with hedge*	+\$1.25/cwt.	+\$1.25
Returns over costs without hedging	-\$0.75/cwt.	+\$3.75
Hedging with put options	Example 3	Example 4
Strike price (June 1)	\$12.00	\$12.00
November put option premium (June 1)	-\$0.60	-\$0.60
November futures price (December 5)	\$10.00	\$14.50
November put option premium (December 5)	+\$2.00	\$0
Net on hedge	+\$1.40	-\$0.60
December Class III price	\$10.00	\$14.50
Basis	+\$1.00	+\$1.00
Mailbox price	\$11.00/cwt.	\$15.50/cwt.
Net mailbox price received*	\$12.40/cwt.	\$14.90/cwt.
Returns over cash costs with hedge*	+\$0.65/cwt.	+\$3.15/cwt.
Returns over cash costs without hedge	-\$0.75/cwt.	+\$3.75/cwt.

\* Excludes commissions costs.

In Example 1, the producer sells a November futures contract in June at \$12.00. When the producer lifts the hedge in November, the futures price has fallen to \$10.00, resulting in a gain of \$2.00 which increases the net mailbox price to \$13.00 (10.00 Class III + 1.00 basis + 2.00 gain).

In Example 2, the producer sells the same futures contract for \$12.00. When the hedge is lifted in November, the futures price has risen to \$14.50 resulting in a loss of \$2.50. But the mailbox price has also risen, settling at \$15.50. When adjusting the mailbox price for the loss in the futures market, the resulting net mailbox price is \$13.00 (14.50 Class III + 1.00 basis - 2.50 loss).

In Example 3, the producer buys a \$12.00 strike price put option for \$0.60. When the hedge is lifted, the futures price has fallen to \$10.00. The option is sold for \$2.00. After subtracting the \$0.60 cost of the put premium from the \$2.00 gain, the net gain on the hedge is \$1.40. When added to the mailbox price, the net mailbox price is \$12.40.

In Example 4, prices have risen to \$15.50 when the hedge is lifted. Since the futures price is above the put option strike price, the put option expires without value. The producer simply lets the option expire and his loss is equal to the option premium. The loss results in a net mailbox price of \$14.90 (\$15.50 Class III + 1.00 basis - \$0.60 option loss).

The producer could have chosen any strike price above or below the \$12.00 strike. For put options the premium increases as the strike price increases, and the cost is less for lower strike price options. The key to hedging with options is to know your basis, production costs, and price objective.

There are a whole lot of things these four examples do not communicate. For example, it's impossible to know ahead of time which example you will land in – 1 or 2, or 3 or 4. Milk prices cannot be predicted so it's not possible to expect all of your hedges to make money. But that's not the point. The point is to get a price that you can live with in the long-term and hit the target rates of return on your business.

## *Proper Animal Care Avoids Image Problems*

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There is no question the public is concerned about how farm animals are treated. Surveys have shown that about 80% of people feel animals have rights related to pain and suffering. These attitudes are enhanced by media stories that show animals unable to walk and being dragged onto trucks.

Based on these public concerns, the food industry has specified how animals are treated on farms where meat, eggs, and milk are produced for their suppliers. Some progressive farmers would like their operations inspected and certified as "animal friendly" as a market tool. However, the movement to assuring proper animal care before selling your product is fast becoming a market-access issue, not just a niche marketing tool.

Dairy producers must be concerned with public perceptions as well as legal ramifications. There is a case pending with a state labor department where a dairy employee filed a complaint when a producer told the employee to end a sick calf's life with a hammer blow to the head.

Most producers recognize the importance of comfortable, healthy cows and go to exceptional efforts to assure cow comfort. For example, grooming freestalls and open lots takes a lot of time in a busy dairy schedule. Dairy producers should be proud of these efforts and explain them to the public at every opportunity, because their concerned actions speak louder than words.

The goal of most producers is to avoid injuries and serious disease that cause terminal calves and downer cows. Following are practices that limit problem animals and support good animal care:

- \* Handle all animals calmly and gently. Take time to train employees about cow behavior and flight zones. Additional information may be retrieved in both English and Spanish from Dr. Temple Grandin's website (<http://www.grandin.com/temple.html>). Dr Grandin teaches livestock behaviour and facility design at Colorado State University.

- \* Move cattle as a group when possible; They are comforted by the safety of the herd.

- \* Avoid slippery floors, long walking distances, and equipment that can injure animals such as broken gates and freestalls.

- \* Treat feet and leg problems immediately. Provide adequate resting space for each animal.

- \* Even under the best management some animals get seriously ill. Treat downer cows and calves in special medical facilities away from the production herd. Provide extra care to these animals such as easy access to feed and water, good lighting for better observation, a vital signs check schedule, clean and dry bedding with good ventilation, shade, access for equipment to assist animals when necessary, and written treatment protocols.

- \* Use special harnesses, a sheet of plywood, or belted tarps for moving and assisting downer cows. Chains or ropes around limbs, necks, and tails may cause more damage and are not an efficient way to move large compromised animals. Protocols for handling downer cows that encourage rapid recovery and cow comfort should be developed at each dairy. Downer cows are not well received at the slaughter plant.

- \* When possible, feed the animal for a time to improve the body condition and general health before marketing.

- \* In conjunction with your veterinarian devise sound protocols for euthanasia. The American Association of Bovine Practitioners has produced a manual of practical cattle euthanasia that is available on the web at <http://www.AABP.org/>

- \* Carcasses of dead animals should be disposed of quickly according to local regulations. Information on carcass composting is available on the web at <http://www.cvmbs.colostate.edu/ilm/outreach/composting.htm>.

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