



# Western Dairy News

for the West, about the West, from the West

## Managing feed & milk price risk: Futures markets

By Dillon M. Feuz  
Dept. of Applied Economics,  
Utah State University

### first of 2 parts

In the last several years milk prices have followed the volatile trend occurring in other commodity markets. From 1989 to 1998 monthly milk prices generally varied between about \$11.50 and \$13.50 per hundredweight. But in the last 10 years prices have been more volatile, with several instances of prices over \$15/cwt. and even a few months over \$20/cwt. The positive offshoot of this increased variability is that prices are usually higher than lower.

Feed costs account for about half of the total cost of producing milk. Feed prices are also volatile and have increased substantially since 2006. Although there are many factors that contribute to higher and more variable feed prices, the coupling of corn prices with oil prices due to mandated increase in ethanol use has been most significant. This new demand for corn has increased all crop prices, as there is a limited number of crop acres and other crop prices are based on the energy equivalent to corn.

The U.S. dairy industry has become increasingly involved in export sales. This involvement has led to increased demand for milk, but also an increased volatility in milk prices because exports are influenced by market factors in the importing countries, market factors from competing export nations, and the strength or weakness of the U.S. dollar.

What has happened to dairy producers' returns in this market environment of increased volatility? What tools are available for producers to manage this increased risk? In this month's article I will discuss the futures and options markets and the advantages/disadvantages of these tools in managing milk and corn price risk. In next

month's article I will discuss management of risk and volatility, and explain a relatively new insurance product, Livestock Gross Margin-Dairy (LGM-Dairy).

### Futures

Futures contracts are standardized, legally binding agreements to buy or sell a specific commodity such as corn or milk in the future. The buyer and seller of a futures contract agree on a price today for a specific quantity and quality of a commodity to be delivered at a specific time and location.

The specifications of the futures contracts, quantity, quality, delivery time and location are all predetermined by the futures exchanges that trade the commodities. However, the price in a competitive market environment is determined by the individuals wanting to either buy the commodity or sell the commodity.

Many individuals who buy and sell futures contracts never own or intend to own the actual commodity. Some individuals do own or intend to purchase the commodity in the future, and these individuals can force others to either take delivery from them or make a delivery to them for the specified quantity and quality of a commodity. This action, or threat of action, is one mechanism that ensures that the underlying cash market and futures market for the commodity tend to respond in like manner to new supply and demand information.

Buying or selling futures is similar to entering into cash forward contracts to buy or sell a commodity. The main difference is that in a forward contract delivery almost always occurs, and in trading futures participants change position (buy or sell) rather than actually exchange deliverables.

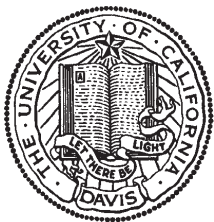
For example, suppose a dairy contracted in May with a farmer to buy 5,000 bushels of corn in November for \$4.00 per bushel. Normally, in November the dairy would receive the 5,000 bushels and pay \$4.00 per bushel. If cash prices had declined to \$3.50 per bushel, then the dairy would be worse off for contracting. However, if the cash price in November increased to \$4.50 per bushel, then the dairy would be better off for contracting.

An alternate approach might involve the use of futures. A dairy buys a December corn futures contract in May for 5,000 bushels at \$4.00 per bushel. In November the dairy actually purchases and receives 5,000 bushels at \$3.50 per bushel of corn from the neighbor. To break even the December corn futures must sell at \$3.50 (assuming zero basis). Effectively, the corn cost \$4.00 per bushel because December corn futures were bought for \$4.00, sold for \$3.50 and lost \$0.50 per bushel (\$3.50 cash + \$0.50 futures loss).

On the other hand, if the cash price in November was \$4.50, the corn from the neighbor cost \$4.50 per bushel, and then the December corn futures sold for \$4.50, \$0.50 per bushel would have been earned in the futures market. The effective price paid for corn would be \$4.00 (\$4.50 cash - \$0.50 futures gain). In this illustration of a cash forward contract or the purchase of corn futures, the price of corn ended up at \$4.00 per bushel regardless of whether the market moved higher or lower.

The advantages of using futures compared to a cash forward contract are that you can buy or sell them anytime the market is open; you can negotiate a contract more than a year in advance; and there are no direct negotiations with the other party. The disadvantages are that you must put  
*(continued on next page)*

### Western Dairy News is a collaborative effort of Dairy Specialists from:



Utah State  
UNIVERSITY  
EXTENSION



Colorado  
State  
University  
*Knowledge to Go Places*



## Managing price risks . . .

(continued from previous page)

up a performance bond (margin money) in a futures trading account; maintain a minimum balance in the account; and differences between the cash price and the futures price are not always equal or predictable. This creates what is known as basis risk:

**Basis = local cash price - futures price.**

A dairy producer can lock in a fixed selling price for milk by executing a short hedge (the net realized price will vary somewhat due to basis). The expected hedge price is the futures price plus or minus the expected local basis. In the case of milk, mailbox price is the local price and Class III milk futures is used for the futures market.

This strategy is executed by selling the futures contract the month that the cash sale is expected to occur. The hedge is lifted at the time the milk is sold in the cash market by buying back the futures contract at that time.

For example, in August 2008, the December Class III milk futures price was \$17/cwt. If your mailbox price of milk in December is normally \$1 above the Class III milk futures, then a producer who sold a December Class III milk futures contract for \$17 would have expected to receive a net price for milk of \$18 in December. In December 2008 this contract was trading for \$15/cwt. If your mailbox price in December was \$16, then your basis was as expected, and your net price for milk would have been \$18 per cwt. (\$16 mail box price + \$2 gain in futures from selling at \$17 in August and buying for \$15 in December).

A dairy producer could lock in a fixed purchase price for feed grains by executing a long hedge (the net realized price will vary somewhat due to basis). The expected hedge price is the futures price plus or minus the expected local basis. This strategy is executed by buying the futures contract for the month that the cash purchase is expected to occur. The hedge is lifted at the time the corn is purchased in the cash market by selling the futures contract at that time.

For example, in December 2008 May Corn futures were trading at \$4.00 per bushel. If your local cash price in May is typically \$0.25 higher than the May futures, then your expected net purchase price would be \$4.25 per bushel. To hedge the corn you would sell May futures in December and then buy back May futures in May when you actually buy the corn. If the market increases between now and May, you will pay more for cash corn but realize a gain in the futures. If the market is lower in May, you will gain in the cash market but have a loss in the futures.

## Options

An option is a legally binding contract that contains a right, but not an obligation, to either buy (call option) or sell (put option) an underlying futures contract. Producers choose the specific price (strike price) that they want to insure, and the cost

(premium) is negotiated in the marketplace. One of the primary differences between futures and options is that a futures contract is an obligation to either buy or sell the underlying commodity, whereas an option provides the right but not the obligation to either buy or sell the underlying commodity futures contract. With a futures contract, both the buyer and seller have market obligations to fulfill.

Dairy producers can establish a minimum or "floor" price for milk by buying a put option on the Class III milk futures. The floor price that the put option offers is the strike price of the option minus the premium costs, plus or minus the expected basis. (The floor price will vary somewhat due to basis).

This strategy is executed by buying a put option. A higher strike price (more insurance) will result in a larger premium cost, and the longer the time until the option expires will also result in higher premiums. If the underlying market increases the most a producer can lose is the premium. So, purchasing a higher strike put at a higher premium will result in a lower net selling price if the market increases compared to purchasing a lower strike put at a lower cost. But if the market declines the higher strike put will result in a higher floor price.

A dairy producer must weigh the premium costs against the level of price insurance to determine what option strike price to purchase.

When milk is sold in the cash market you usually would sell the put option if it had any value. If milk prices have increased above the strike price then it is likely that the option will have no value and you simply let it expire. However, if prices have declined below the strike price, then it will have value. Selling this put for that value is why you have purchased the price insurance. This is what establishes a minimum price.

There are several advantages of buying a put option over selling a futures contract:

- You establish a minimum price but you can still take advantage of higher prices.
- There is no performance bond required, no margin calls.
- You can choose the level of price insurance (strike price) that is best for you. However, you must pay the premium cost and

purchasing price insurance a long time in advance of sale can be expensive.

Dairy producers can establish a maximum or "ceiling" price to be paid for corn by buying a call option. The ceiling price that the call offers is the strike price of the option plus the premium costs plus or minus the expected basis. (The ceiling price will vary somewhat due to basis). This strategy is executed by buying a call option.

A lower strike price, more insurance, and longer expiration time will increase the premium cost. If the underlying market decreases, the most a producer can lose is the premium. Purchasing a lower strike call at a higher premium will result in a lower net selling price if the market decreases compared to purchasing a higher strike call at a lower cost. If the market increases the lower strike call will result in a lower ceiling price.

A dairy producer must weigh the premium costs against the level of price insurance to determine what option strike price to purchase.

When corn is purchased in the cash market, you usually would sell the call option if it had any value. If corn prices have decreased below the strike price it is likely that the option will have no value and you simply let it expire. However, if prices have increased above the strike price then it will have value. Selling this call is why you have purchased the price insurance. With the call option you can establish a maximum price but you can still take advantage of lower prices, there are no margin calls, and you can choose the level of price insurance (strike price) that is best for you.

Once again you must pay the premium cost to obtain this protection, which may be very expensive if purchased a long time in advance. Also, it is important to note that most grain options expire about 30 days prior to the futures contract expiration.

As an example of a call option, May corn futures were trading at \$4.00 per bushel in December 2008 and you could purchase a \$4.10 strike for \$0.40 per bushel. If your local cash price in May is typically \$0.25 higher than the May futures, then your expected maximum purchase price would be \$4.75 per bushel (\$4.10 strike + \$0.40 premium + \$0.25 basis).

If the market increases between now and May to \$6.25 for your cash price and May corn futures are at \$6.00 you will pay more for cash corn but you will realize a gain in the options market. You could sell the \$4.10 call option for \$1.90 per bushel (\$6.00 minus \$4.10). Your net purchase price for the corn would then be \$4.75 per bushel (\$6.25 cash price + \$0.40 premium to purchase option minus \$1.90 premium to sell the option). If the cash market is at \$3.00 in May you will gain in the cash market and you will forfeit your \$0.40 call premium. Your net price for the corn would be \$3.40 per bushel.

More information on trading dairy futures and options can be obtained at: [http://www.cme.com/files/Primer\\_for\\_Traders2.pdf](http://www.cme.com/files/Primer_for_Traders2.pdf)

Additional information on trading corn futures and options can be accessed at: <http://www.cbot.com/cbot/docs/76474.pdf>

**Western Dairy News** is published as a service to people interested in the health and welfare of the Western dairy industry. Archives of this publication may be found at:

<http://animalscience-extension.tamu.edu/dairy/wdn.html>

For further information contact:

Dr. Ragan Adams, Editor  
ILM, CSU-VTH  
300 W. Drake Road  
Fort Collins, CO 80523  
970-297-0371  
radams@lamar.colostate.edu

Material published in **Western Dairy News** is not subject to copyright. Permission is therefore granted to reproduce articles, although acknowledgement of the source is requested.

Cooperative Extension programs  
are available to all without discrimination.