



Using Milk Futures to Lock in Profitability

Why Use Futures?

Milk production has always been a risky business. Cows get sick, forage and crops face bad weather, and machinery seems to always break down at the worst times. Now add to that a volatile and unpredictable milk price. Both the Class I price and the Class III price are illustrated in Figure 1. How do you plan a business when the selling price of your product rises and falls with weather, trade, seasonality, and consumer whims?

The fact is dairy farmers have large investments in their businesses given the sales volume they do. This issue is particularly critical when producers undergo expansions. Thus, a good strategy is to lock in a milk price and an associated feed price for a set volume of milk. The difference in milk and feed prices—called the milk margin—is what is needed to pay all the rest of the bills on the farm and to realize a profit. Therefore, using a strategy to protect the margin makes good business sense.

Brokers versus Cooperatives

One way to protect the milk margin is to use the futures markets to forward price milk and feed. There are two basic ways that farmers can lock in future milk prices. One is to hire a broker and “hedge” milk at the Chicago Mercantile Exchange (CME). The CME has milk futures that allow producers to lock in a Class III price for every month of the year, but that futures contract has a minimum size of 200,000 pounds. A dairy farmer who milks 100 cows producing an average 70 pounds of milk per day will

generate 217,000 pounds a month, just over the size of one CME contract. Thus, the CME contract size for small dairy producers may be too big. The advantage of working with a broker is that producers can get in and out of a particular contract when they want to, as well as get advice from their brokers. The downside is that they must set up a margin account with a broker and be subject to margin calls if the market moves in a certain direction.

An alternative to hiring a broker is to forward contract milk through a cooperative. Cooperatives have the ability to offer smaller contract sizes (20,000 to 25,000 pounds per contract), which are much more appealing to smaller farms. They do this by matching up several producers when taking a position on a contract. So, a producer with just 100 cows can theoretically lock in 4 to 5 contracts

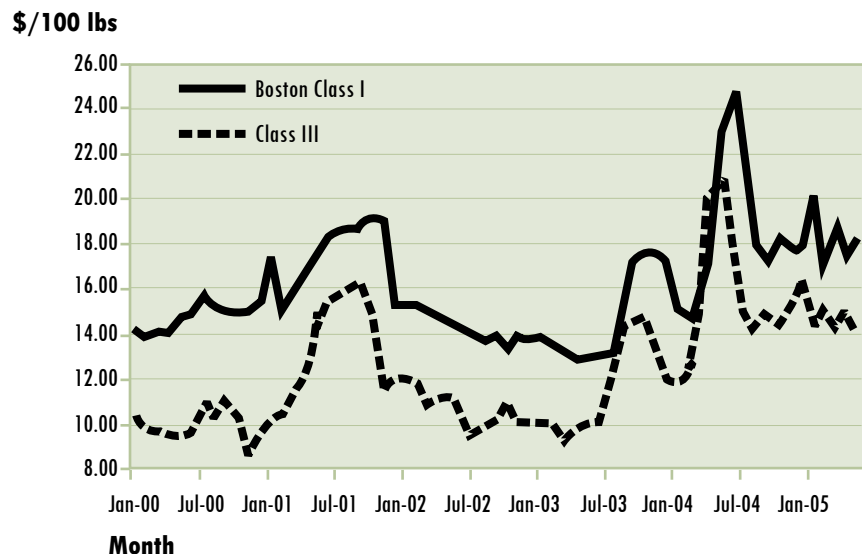
in a given month and still end up contracting on less than 50 percent of their milk production. Therefore, the advantage of contracting with a cooperative is that you don't have to set up a margin account with a broker, but the downside is that you likely can't get out of the contract before it expires and you won't get much advice from your cooperative on when and when not to contract.

Most following discussion will assume that producers are contracting milk through their milk cooperative. In addition, this paper will focus on milk futures only, although contracting both milk and feed makes good economic sense.

Estimating a Planning Price

The key to using the futures markets is to know when to take a position in the market (for dairy producers

Figure 1. Monthly Boston Class I and Class III prices.



this is called a “sell”). There are two basic considerations: (1) is the price the market is offering a “good price” from a historical perspective, and (2) is this price above a producers cost of production?

The CME trades milk futures everyday. All months are traded (January through December). For example, producers who want to contract for September milk can watch the daily trades and then contact through their cooperative when the price reaches an acceptable level. To determine if the price offered is good or acceptable relative to historical averages, simply compare the offered price to the five-year average Class III value. For example, on June 28, 2005, the CME offered a September Class III price of \$14.93 per cwt (Table 1), which compares to a five-year average Class III price of \$13.12 per cwt. Since the futures price for September was \$1.81 per cwt above the five-year average, you can have confidence that the price is acceptable.

Another consideration is to compute a **planning price** and to compare this price to ones cost of production. You’ll need the following information: your expected basis, a CME or cooperative futures price, and your cost of production.

Let’s use an example to illustrate the use of planning prices. Jeff and Mary, owners of ABC Dairy of Lancaster Pennsylvania, milks 75 cows, produces 18,500 pounds of milk per cow per year, and markets 115,625 pounds of milk a month. They want to protect part of their milk check by forward contracting through their cooperative.

Jeff and Mary are interested in locking in part of their September milk. Their cooperative is offering a futures price of \$14.83 per cwt, \$0.10 under the CME price. The ten-cent difference is used by the cooperative to cover the cost of running a forward-pricing program (broker fees, interest on margin funds, etc). Jeff and Mary know they normally have

a milk check that is \$2.50 per cwt above the announced Class III price. This difference is called “basis.” It reflects higher component values, marketing premiums, and benefits of the federal order. Jeff and Mary decide to compute a planning price in order to consider the cooperatives offer (Table 2). That planning price is \$17.33 per cwt (futures price plus the basis). Given their cost of production of \$15 per cwt, it is clear that they will do well locking in part or all of their September milk production at this price.

Procedure for Locking in Milk Prices

The step-by-step procedure for locking in milk prices is outlined below:

1. Pick a month that you want to protect milk revenue.
2. Consider how much milk to protect after analyzing production levels and forward contract sizes.
3. Monitor milk futures on a daily basis.
4. Estimate a planning price for select contract prices.
5. Contract on a set volume for a particular month at a fixed price.
6. After the contract expires, calculate how you did.

ABC Dairy markets their milk through a cooperative that offers a forward-contracting program. Their contract size for Class III milk is 25,000 pounds. Jeff and Mary want to contract no more than 50 percent of their milk in any given month. For September they are interested in two contracts totaling 50,000 pounds of milk, or 43 percent of their expected September milk production. They calculated their historical basis and a September planning price based on a futures contract of \$14.83 per cwt for Class III milk. After considering the planning price they decided to go ahead and contract with their cooperative. They simply filled out a form and faxed it to their cooperative.

Table 1. Class III Prices versus Milk Futures at the Chicago Mercantile Exchange.

	2000	2001	2002	2003	2004	5-Year Average	6/28/05 Futures 2005	2005 Futures less 5-year Avg
Jan	10.05	9.99	11.87	9.78	11.61	10.66	14.14	3.48
Feb	9.54	10.27	11.63	9.66	11.89	10.60	14.70	4.10
Mar	9.54	11.42	10.65	9.11	14.49	11.04	14.08	3.04
Apr	9.41	12.06	10.85	9.41	19.66	12.28	14.61	2.33
May	9.37	13.83	10.82	9.71	20.58	12.86	13.77	0.91
Jun	9.46	15.02	10.09	9.75	17.68	12.40	13.92	1.52
Jul	10.66	15.46	9.33	11.78	14.85	12.42	14.48	2.06
Aug	10.13	15.55	9.54	13.80	14.04	12.61	14.95	2.34
Sep	10.76	15.90	9.92	14.30	14.72	13.12	14.93	1.81
Oct	10.02	14.60	10.72	14.39	14.16	12.78	14.04	1.26
Nov	8.57	11.31	9.84	13.47	14.97	11.63	13.61	1.98
Dec	9.37	11.80	9.74	11.87	16.14	11.78	13.32	1.54
Q1	9.71	10.56	11.38	9.52	12.66	10.77	14.31	3.54
Q2	9.41	13.64	10.59	9.62	19.31	12.51	14.10	1.59
Q3	10.52	15.64	9.60	13.29	14.54	12.72	14.79	2.07
Q4	9.32	12.57	10.10	13.24	15.09	12.06	13.66	1.59
Annual	9.74	13.10	10.42	11.42	15.40	12.02	14.21	2.20

Table 2. Calculation of a Planning Price for ABC Dairy (\$/cwt).

Class III futures price as of June 28, 2005	\$14.83
Historical basis	\$2.50
Futures planning price	\$17.33
Cost of production (includes hauling costs and return on capital)	\$15.00

Now they must wait until the end of September when USDA will announce the actual Class III price. This is when their futures contract expires.

Jeff and Mary understand that they will end up with a September milk check that is close to their contacted price. Any differences will be due to the unpredictability of the basis and the volume of milk they contract. They also understand that the actual announced Class III price will likely not be the same as their contract price since no one can accurately predict future milk prices. That difference will be reflected as a gain or loss on their September milk check.

Table 3 illustrates what would occur if the **market strengthened** and rose above their expected contract price of \$14.83 per cwt. In this case, the announced Class III price was \$15.83 per cwt, or \$1.00 per cwt above the contract price. The actual milk check price in September was \$18.33 per cwt (note that this assumes a perfect basis forecast of \$2.50 per cwt). Given production of 115,625 pounds of milk, that generated revenue of \$21,194 for September. Jeff and Mary won't get all of that revenue because they agreed to a Class III contract price of \$14.83 per cwt on 50,000 pounds of milk. Therefore, the cooperative deducted \$500 from their milk check. They ended up with an average pay price of \$17.90 for the month. After deducting the basis of \$2.50 per cwt, they are left with a \$15.40 per cwt Class III value net of contracting, which is above the contract price of \$14.83. Why is this higher than their agreed to price? Because they did not contract all of their milk and the market rose above their expectations.

Thus, Jeff and Mary did well—they protected 43 percent of their milk and had a market gain on the unprotected portion.

Now assume that the **market weakened** (Table 4). The September Class III price fell \$1.00 per cwt below the contract price of \$14.83 per cwt. Assuming a perfect basis forecast of \$2.50 per cwt, an actual milk check price of \$16.33 per cwt would be realized, which would generate revenue of \$18,882 on 115,625 pounds of milk. Since the market fell below the contract price, Jeff and Mary would realize a gain of \$1.00 per cwt on the 50,000 pounds of milk that they contracted. Thus, \$500 would be added to their milk check, raising the

total to \$19,382, which would realize a net milk check price of \$16.76 per cwt. After subtracting the basis of \$2.50, an average Class III value of \$14.26 per cwt would be produced after contracting. But wait, this Class III value is below the contract price of \$14.83 per cwt! Again, that's because Jeff and Mary contracted just 43 percent of their milk production. In this case, the market weakened and they lost revenue on the unprotected portion of their milk check.

Milk Futures at the CME

Cooperatives can offer forward-contracting programs since they turn to the CME and contract their members' milk using the CME milk futures. In addition to the milk futures contract for Class III milk, the CME also has contracts for Class IV milk and for butter. But at the moment only the Class III milk futures contracts are in active use.

The world of the CME seems far removed from the lives of most dairy

Table 3. Impact of a Rising Class III Price on the Milk Check.

	Milk Price (\$/cwt)	Milk (lbs)	Revenue (\$)
Milk Check	18.33	115,625	21,194
Futures Contract:			
Class III Contract	14.83		
Actual Class III	15.83		
Difference	-1.00	50,000	-500
Grand Total			20,694
Net Price	17.90		

Table 4. Impact of a Falling Class III Price on the Milk Check.

	Milk Price (\$/cwt)	Milk (lbs)	Revenue (\$)
Milk Check	16.33	115,625	18,882
Futures Contract:			
Class III Contract	14.83		
Actual Class III	13.83		
Difference	1.00	50,000	+500
Grand Total			19,382
Net Price	16.76		

producers. The ups and downs of contract prices, who buys and who sells, and who makes and loses money are at times confusing. So here is a simple primer on how the market works.

The CME trades physical quantities of block and barrel cheese (called a cash market) and a milk futures for Class III milk. Both markets work hand in hand. The cash market sets daily cash prices for blocks and barrels, and the milk futures sets future prices for Class III milk.

A futures contract is simply an agreement between two parties on how to price a commodity in the future. The contract states clearly what characteristics the commodity must have, what the contract month is, and what the contract price is. For this publication we are interested in the commodity milk. A “buyer” and a “seller” then agree to a common price. Sellers are typically dairy producers or their cooperatives. They are concerned that Class III prices will fall in the future. A buyer is typically a cheese processor or company that buys cheese. A buyer is concerned that Class III prices, and, hence, cheese prices will rise in the future. Contracts are normally made through brokers who work with the exchange and a clearinghouse. The clearinghouse simply enforces the rules of the contract. After the contract is agreed to, the dairy producers will market their milk as normal. But at the end of the contract—after the Class III price is announced by the USDA—an exchange of cash takes place.

If the market price falls below the contract price, then sellers or dairy farmers will receive price protection. The buyer at the other end of the contract—the cheese processor—will need to forward the difference between the actual market price and the contract price to their broker. The broker for the cheese company will then pass this on to the clearinghouse, who will forward it to the broker for

the dairy farmer. The dairy farmer will then receive these funds into their brokerage account (it works the same way for the cooperative). The funds can then be used to offset the market loss.

If the market price rises above the contract price, then the buyer or cheese processor will receive price protection. Here the dairy farmer will need to forward the difference between the higher market price and the agreed-upon contract price to their broker. These funds then end up on the brokerage account for the cheese processor. The cheese processor can use these funds to offset the rise in their input costs (higher market prices for Class III milk).

The important points to consider are that both parties got the agreed-upon price that they contracted for, and it’s clear where the money went.

Analyzing Cooperative Contracts

Dairy cooperatives have been very creative in offering their members many products that they can use to protect their future milk revenue. In some cases, cooperatives may negotiate a contract directly with a buyer on a specific volume of cheese or butter at a specified price. In that case, the cooperative would offer their members a fixed-price contract for a set volume of milk over a specified period of time (six months, a year, etc.). Cooperatives can also offer a twelve-month or six-month contract to their members on Class III milk using the CME futures market. Or they may offer a basis contract whereby they would attempt to protect the entire value of a producer’s milk check, not just the Class III value.

In all of these cases, producers would use the same procedure above to calculate whether the cooperative offering is a good deal or not. In the case of a butter or cheese contract, a producer must look at historical market prices and then compute how this product relates to the volume of

milk they produce (e.g., 10 pounds of milk required to produce 1 pound of cheese).

Strategy and Planning

Milk futures are a very good tool to use for planning purposes. Dairy producers are encouraged to budget their income and expenses regularly. Milk futures and feed contracts help in this planning process since they represent gross revenue and a major expense for the business. Dairy farmers are encouraged to construct monthly or quarterly budgets for planning purposes.

Use of milk futures also requires the use of simple strategies. You should not simply go out and “lock it all in” in one day. The end result of such a strategy could be immense disappointment. The following guidelines should be considered in developing a personal marketing strategy using milk futures:

- Don’t lock it all in. Set a minimum and maximum volume of milk to contract each month. If you are new to contracting or have low debt levels, consider less than 50 percent of monthly production. If you are more experienced and have a higher level of debt (e.g., recently underwent a major expansion), consider a maximum volume of 60 to 80 percent.
- Don’t concentrate on near-term or far-off contract months. Given lags in the pricing system, worrying much about contracting next month’s milk production does not make sense. If it is June, then concentrate on August and September milk prices because the July Class III contract likely won’t change much. And, contracts nine months out and beyond are very uncertain. There aren’t many contracts traded for those outer months. So don’t concentrate on those either.
- Lock in more contracts as prices rise. You may decide to contract

30 percent of your future milk production today. If contract prices rise for that particular month in the days ahead, then contract an additional 20 percent. If contract prices later rise above this additional threshold level, you may decide to contract another 20 to 30 percent. This method will allow you to average into a strong price. While you are doing that, don't forget about contracts that are four to eight months out. Those contract months typically do the best in making positive returns when short-term cash markets are rising because strong cash markets today have a positive affect on all contract months. If cash prices eventually weaken, the outer contract months will take on value if the announced Class III price ends up under the contract price.

- Consider using annual or customer contracts offered by cooperatives on a portion of your milk. If it is December and your cooperative is offering you to contract 20 or 30 percent of your annual milk production for the coming year at an above-average price, give this some consideration. You can then augment this contract with other near-term contracts and average into a good price. That said, avoid contracting too much of your milk for the coming year using these contracts. Some producers have contracted ahead on 100 percent of their annual milk production and ended up severely disappointed.

Conclusions

Dairy farmers are facing increased risk with regard to volatile milk prices, which presents problems for dairy producers since dairying involves large investments and large demands for cash flow each month (high costs for feed and labor). Thus, using forward-contracting tools makes good business sense.

Forward-contracting milk through a milk cooperative or directly to the CME with milk futures does exactly what it intends to do: it fixes a future price for Class III milk. While basis risk is still a problem, forward contracting will deliver what it promises. But producer expectations from the time they contract milk to when the contract expires often change. If the market strengthens, then a producer may feel cheated by the contract, or at the very least disappointed that they participated in the futures market. On the other hand, if the market weakens, producers will realize an economic gain from the contract and feel as if they had gambled and won.

For the long term, it makes better sense for producers to contract on a portion of their milk supply and budget and plan on the fixed price. Market prices will rise and fall relative to the contract price, but that should not affect a producer's attitude. The goal is to protect revenue and avoid being forced to refinance the business and lose hard-earned equity. By avoiding price risk, producers can leave behind a gambling mentality and focus instead on improving the rest of their business.

Supported by an informational partnership of Penn State Cooperative Extension, Pennsylvania Department of Agriculture, and USDA's Risk Management Agency.





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Penn State College of Agricultural Sciences research, extension, and resident education programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

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Produced by Information and Communication Technologies in the College of Agricultural Sciences

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CAT UA433 5M12/05ps4720