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Managing feed and milk price risk: Futures markets and insurance alternatives

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

Increased volatility in milk and feed prices leads to greater volatility in dairy producers' net returns. There will be times of very profitable milk production and times when milk production is not profitable at all. Risk management alternatives are available to producers to manage some of this volatility.

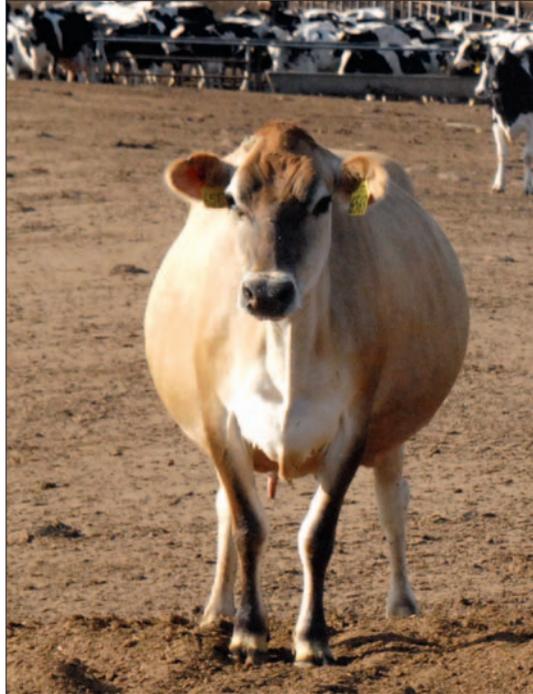
Producers can utilize Class III Milk futures to hedge future milk sales and essentially lock in a fixed price for up to a year in advance. Likewise, producers can utilize Corn futures to lock in a fixed price for corn for over a year in advance if desired.

The market also provides options on these future contracts. By buying put options on the milk futures, producers can establish a price floor, or minimum price, and yet still take advantage of market rallies. Similarly, by buying call options on corn futures, producers can establish a ceiling price, maximum price, for corn and yet still take advantage of lower corn prices if they occur.

The data displayed in Table 1 were divided into three time periods: 1989-98, 1999-2008, and 2006-08. The average price was calculated for each time period, as well as the standard deviations and the coefficient of variation, which is a relative measure of variability.

Milk prices have obviously become more variable. The standard deviation has increased and the coefficient of variation has more than doubled from the earlier time period to the most recent time period. Alfalfa prices have risen considerably and have also be-

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come much more variable. Both milk and alfalfa prices have relative variability now around 20 percent compared to around 10 percent in the 1989-1998 time period. Corn prices are even more variable than either milk or hay prices. The relative variability has increased from 18.52 percent to over 30 percent in the more recent time periods.

Simulated risk - no risk management tools used

In order to understand the effect of different strategies on net returns for each of the three time periods displayed in table one, the budget typical of a 400 cow dairy was used in a simulation. Milk, alfalfa and corn prices were allowed to vary based on the historical variability for each time period. Figure 1 illustrates the simulation results. 500 iterations were run on SIMETAR to simulate net returns and the data is shown graphically.

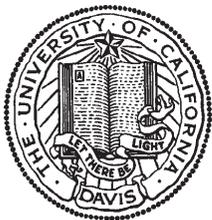
On average dairy producers are earning greater returns per cwt. of milk produced in the more recent time periods compared to the early period. However, there is more risk. There is a higher probability of earning more than \$3 per cwt, but there is also a higher probability of losing money (returns less than 0).

How would the use of futures or options impact these returns? Another simulation analysis was conducted based on the variability for the 2006-2008 time period and the current market prices and future market data for December 2008. One scenario for the simulation assumed that no risk protection was used. A second scenario involved the use of futures hedges. Milk price was hedged using the Class III Milk futures and basis

Table 1: Average, standard deviation, and coefficient of variation for milk price (\$/cwt.), alfalfa price (\$/ton) and corn price (\$/ton). (National average prices.)

	1989-98	1999-2008	2006-08
Milk price			
average	13.48\$	\$14.77	\$16.82
standard deviation	\$1.33	\$2.78	\$3.44
coefficient of variation	9.83%	18.81%	20.44%
alfalfa price			
average	\$91.04	\$105.82	\$132.99
standard deviation	\$10.90	\$23.62	\$25.34
coefficient of variation	11.97%	22.24%	19.06%
corn price			
average	\$2.50	\$2.47	\$3.45
standard deviation	\$0.46	\$0.89	\$1.09
coefficient of variation	18.52%	36.04%	31.55%

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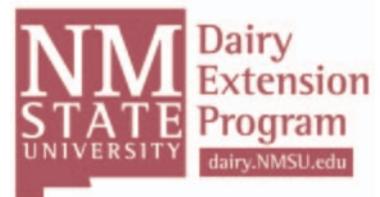
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Price risk management . . .

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was assumed to vary between \$0.50 and \$1.50, in other words the producer's mail box price would be \$0.50 to \$1.50 per cwt. above the Class III Milk futures.

Corn price was also hedged using Corn futures. Corn basis varied between \$0.25 and \$0.75 per bushel. A third scenario involved the uses of options rather than futures. Put options for Class III Milk were purchased to establish a minimum price for milk and call options for Corn were purchased to establish a maximum price for feed.

Alfalfa hay prices varied in the simulation based on the recent variability and there was no risk protection used with regards to alfalfa price.

The data is not illustrated but the results indicate that remaining in the cash market is the most risky and returns vary the greatest. However, in the case of the current market conditions the expected return is also higher by remaining in the cash market. This will often be the case; essentially it costs you something to remove risk from your operation.

Using the futures market to lock in milk and corn prices is the least risky alternative; returns vary the least. There is still hay price risk in this scenario, and also basis risk with milk and corn.

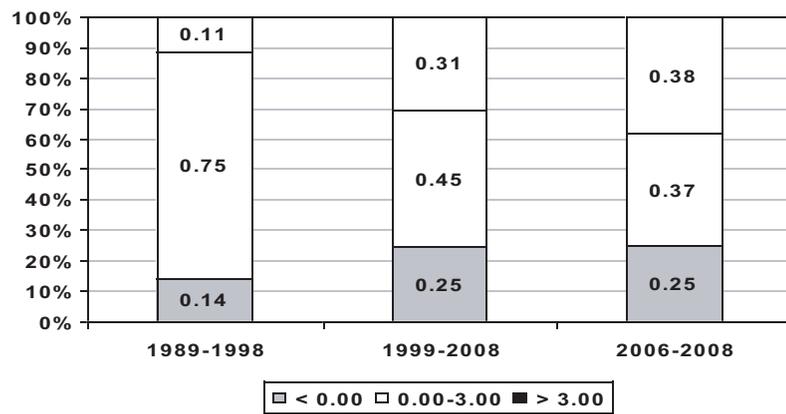
What is generating the higher expected returns or the lower expected returns with each scenario? The higher returns result when milk prices are higher and corn and alfalfa prices are lower, and obviously the reverse is true that the lower returns occur with low milk prices and high feed costs. Therefore, what is obvious is that when milk prices are higher and feed costs are lower your best alternative is the cash market. However, when milk prices are lower and feed costs are higher, than having milk and corn prices locked in with futures is the best alternative in terms of net return.

The question always is: will milk prices move higher or lower, and will feed costs move higher or lower? If you could answer that you would know your best risk management strategy, cash or futures. However, given that you don't know what will happen, as you consider the options strategy it is always a close second to the "best" strategy. You only lose your premium and still take advantage of higher milk and lower feed prices, but when milk prices decline and feed costs rise you have protection.

The expected net returns will vary based upon your individual costs and production values. They will also vary with market conditions. There may be times when there is no real probability of losing money with any of the risk management scenarios.

Likewise, there may be times, such as the present, where there is a real probability of losing money, regardless of the risk management strategy employed. However, as these market conditions change, there will be little change in the relative position and slope of the three alternatives: cash

Figure 1: Probability of milk returns less than \$0.00/cwt. and greater than \$3.00/cwt.



will always show the greatest variability; futures will always show the least variability; cash will be preferred when markets move in your favor; futures will be preferred when markets move against you; and options will always be a second best alternative. But as can be seen, sometimes returns don't differ much between the "best" and second best alternative, but do differ substantially compared to the third or poorest alternative.

Insurance

The United States Department of Agriculture-Risk Management Agency (RMA)

Over time, the expected returns to dairy producers who remain strictly in the cash market will likely exceed the returns of those who utilize some form of risk management.

has recently released a new insurance product for the dairy industry starting with the 2009 insurance year. It is known as Livestock Gross Margin-Dairy (LGM) and it is designed to insure the margin between feed costs and milk revenue.

LGM Dairy protects against loss of gross margin (market value of milk minus feed costs) on milk produced from dairy cows. The indemnity at the end of the 11-month insurance period is the difference between the gross margin guarantee and the actual gross margin (if positive). The policy uses

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For further information contact:

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

radams@amar.colostate.edu

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futures prices and state basis for corn and milk to determine expected and actual gross margin, and may be tailored to any size farming operation.

LGM Dairy is different from traditional options in that it is a bundled option covering the price of both milk and feed costs. Producers can sign up 12 times per year and insure up to 240,000 cwt per year. More information about the program is available at the USDA-LGM website at: <http://www.rma.usda.gov/news/2008/05/lgmdairy.html>

While the product claims to insure the margin between

milk revenue and feed costs, it really only insures the margin between milk revenue and corn and soybean meal or their equivalents. Hay and pasture costs are not part of the insurance. The product is also not available in all states. Most states west of the Mississippi are eligible to participate in LGM-Dairy with the notable exception of California, New Mexico, Idaho, Oregon and Washington. However, it may be the case that those states will become eligible in future years.

In theory, the LGM-Dairy insurances is similar to purchasing a put option on milk futures and purchasing call options for corn futures and soybean meal futures. An advantage of the insurance over using the options market is the insurance contract can be tailored to any size of dairy, whereas the options on futures are for fixed quantities of milk, corn and soybean meal. For greater detail on this insurance product the reader is encouraged to read a paper from the University of Wisconsin that can be accessed on the web: http://future.aae.wisc.edu/lgm-dairy/m&P_lgm_dairy_final_v2.pdf

LGM-Dairy insurance was not included in the simulation illustrated in this article. However, it would appear much the same as the options strategy. There would likely be a small advantage of LGM-Dairy over options for those dairies whose size did not match the milk futures or corn and soybean meal futures contract specifications very well. For larger dairies that exceed the limits of the LGM-Dairy policy, obviously the options would be more advantageous.

Summary

In summary, each of these risk management tools can be used to reduce the variability of returns. The use of futures limits variability the most of these alternatives and using options or LGM-Dairy is similar in the amount of reduction in risk. Any time you use the market or insurance to manage risk, there is a cost.

Over time, the expected returns to dairy producers who remain strictly in the cash market will likely exceed the returns of those who utilize some form of risk management. However, if a dairy does not have sufficient capital to withstand some of the bad years and still be in business to take advantage of the good years, then perhaps one of these risk management tools will work for them.