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STANDARD RISK MANAGEMENT APPROACHES**

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Comparison of the Dairy Livestock Gross Margin Program and Standard Risk Management Approaches

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Dairy producers in Pennsylvania are increasingly at risk from volatile milk and feed prices. In some months milk and feed prices appear to be correlated, as in 2008. However, in the first quarter of 2009, milk prices fell relative to feed costs, squeezing gross margins for milk producers. The purpose of this paper is to analyze the basic financial tools that are available to Pennsylvania milk producers to deal with this risk. In particular, we will compare existing risk management tools to the new Dairy Livestock Gross Margin (LGM) Program offered by USDA's Risk Management Agency.

Existing Risk Management Tools

Milk producers in Pennsylvania have a number of choices currently available to them for managing price risk. A summary of these tools is below.

Forward contracting milk: Milk producers that belong to a dairy cooperative have the opportunity to forward price their milk. Simply put, they can agree to a forward price on a set volume of milk. The cooperatives often offer this service at a price set below the futures prices available on at the CMEGroup (CME). The price reduction is set in order to cover the costs of providing this service (administrative costs, margin costs, brokerage fees, etc.). One advantage for small milk producers is that the cooperatives offer risk protection on milk at contract sizes below those offered on the CME (200,000 pounds for milk). The contract size offered by cooperatives under forward contracting is usually 20,000 – 25,000 pounds. Another advantage to milk producers is that they do not need to hire a broker or meet margin requirements.

However, there are some minor disadvantages as well. First, a milk producer must accept a discounted price (usually 15 cents per cwt below the CME futures) even if the cooperative never faced a margin call on the contract. Second, a producer is often locked into the contract for the duration of the contract's life (the producer cannot exit the contract before expiration). That's because coops often aggregate a number of contracts to meet the exchange requirements of 200,000 pounds of milk per contract. Third, forward contracts lock a producer into a particular price. If the market price rises above the agreed price, the producer will not receive this higher price. This is very similar to hedging your milk through a broker.

Forward contracting feed: Milk producers can also forward price their feed needs. Often this involves signing a contract with a local grain elevator to deliver feed to the farmer in the future at set prices. The grain elevator handles all the hedging requirements. The advantages and disadvantages of forward pricing feed are similar to that of milk. The prices are set and the prices are slightly less attractive to cover the feed dealer's costs.

Hedging milk and feed through a broker: Hedging milk through a broker is similar to forward pricing milk. In this case a milk producer would select a broker and set up a margin account. The broker would

then execute trades on behalf of the producer through a Futures Commission Merchant (FCM). To initiate a trade the producer would direct the broker to buy or sell futures contracts, pay a brokerage commission, and deposit initial and maintenance margin funds on specific contracts and volumes with the FCM. Once a position is taken, if the market goes against the producer's trade (for example the market rises after a producer has sold a milk contract), the producer would have to meet margin requirements on a daily basis. This will require depositing additional funds in the brokerage account to offset the paper loss on the contract.

One advantage of dealing with a broker is that the broker may provide the producer with advice. Second, the net price may be better because the farmer will not be paying the cooperative or the feed dealer to hedge. Third, the producer can exit the position if market conditions change.

One may argue that a disadvantage of using a broker is that milk producers are subject to margin requirements. However, this is basically a financing issue. The farmer will need to have funds in the brokerage account and may have to deposit additional funds should the market move against his position. The producer will get this money back when he sells his milk. The milk check will reflect the higher price and provide the revenue to settle the margin account. Without exception, milk producers should establish a line of credit with their local bank in order to deal with this potential cash flow need prior to executing a trade.

Hedging milk and feed through a bank: In some cases milk producers may be able to use brokerage services through a bank. For some this is convenient as the bank finances any potential margin calls. This case it is similar to a forward contract, but allows the producer to exit positions at any time. The bank will execute the trade and will manage all margin requirements. One disadvantage to this approach is that the actual costs of brokerage fees and margin financing may not be transparent. The cost of this service is part of the overall financing costs provided by the bank to the milk producer.

Using options through a broker: Milk producers often want the protection of a hedge, but don't want to face margin calls. Additionally producers sometimes want to establish a floor price, while still having the opportunity to enjoy higher milk prices should they occur. A method that allows this is to use options. More specifically they would instruct their broker to buy a "put" at a particular strike price (assuming there is no hedged position). This provides the producer the right, but not the obligation, to sell a futures contract at a fixed price in the event the market price declines. In other words, if the market price falls from the time the option is purchased, the milk producer can exercise the option at the strike price and realize a gain that will offset the lower market price (the strike price will be above the market price). If the market price rises, they can benefit from the higher market price and allow the option to expire worthless. Either way the option provides a floor but maintains the upside. This comes at the cost of the premium. Options can also be purchased in combination with futures contracts. If a producer "hedges" his milk at one price to provide a floor and the producer still wants to retain the upside potential, he could also purchase a call option. Then, if market prices rose above the hedged position, gains from the call option (net of the cost of the option) would offset some of the losses on the hedged position, leaving the producer with a net price above his hedged position. Combinations of different

financial instruments can be complex and producers should not get involved in anything that they do not understand. Some cooperatives also offer their members minimum price contracts, which are essentially puts.

The advantage of using options is that there are no margin calls. The downside of options is that this protection comes at a cost, the premium. The premium depends on how far the strike price is from the prevailing futures price, and how much time there is before the contract expires. Still, it is worth noting that in today's markets, there are more options contracts that are traded than actual futures contracts. Thus options contracts for dairy are becoming increasingly popular.

Summary of the Dairy LGM Program

LGM is the federally reinsured dairy insurance program run through the U.S. crop insurance program. It provides milk producers protection against declines in the gross margin on milk production. The gross margin is defined as the market value of milk minus feed costs. The program uses futures prices to compute the expected and actual gross margin on milk. Dairy LGM covers the difference between the gross margin guarantee and the actual gross margin, where the former is defined at the expected gross margin less the deductible.

Process of Using the Dairy LGM Program

Milk producers deciding on whether to insure their gross margin would use the following formulas in order to compute their future gross margins:

1. Projected Margin = Projected All Milk Price – Projected Feed Costs
2. Projected All Milk Price = Class III Futures
3. Projected Feed Costs = Amount of Corn*(CBOT Corn Price) + Amount of Soybean Meal*CBOT Soybean Meal Price

The Dairy LGM program is only available to milk producers on the last business Friday of each month. The sales period begins after the close of markets and ends at 8 pm the following day. Thus there is a brief window once each month in which milk producers can participate in the program.

LGM uses 12 insurance periods in each calendar year. Each insurance period runs for 10 months, not including the month about to begin (first month). Coverage begins starting in the second month. For example, for the January 29, 2009 closing date, coverage will be eligible for March 2010 through December 2010 (February 2010 cannot be covered). When signing up for coverage over the 12 month period, producers can select 1-10 months for coverage (on a month-by-month or average of all months selected). In addition, they don't have to protect 100% of their milk in any one month. Thus they have the option of signing up for Dairy LGM coverage 12 times per year and insure any or all of their milk they expect to market over a rolling 10-month period.

Dairy LGM is an insurance program that works like an options contract. Producers are provided a milk and feed price, elect the months and amount of milk to cover, and determine the level of their deductible. The premium for the insurance is then determined by USDA.

Dairy LGM makes a payment if the gross margin guarantee is greater than the actual gross margin, as defined in the Dairy LGM provisions, at the end of the insurance period. The prices used in these calculations are based on reported futures prices, not actual producer prices faced in the marketplace.

Calculating Expected Milk and Feed Prices

Instead of the actual prices a producer receives in the market, the prices for LGM are based on simple averages of futures contract daily settlement prices. Expected corn, soybean meal, and milk prices for a particular contract month are a simple average over the three days prior to the second to last trading day of the month. If there are no futures contracts available for a particular month, then a weighted average of the surrounding months is used (for corn and soybean meal). So, for the measurement period, if the closing date is January 29 and you want to protect May prices, then one would use average milk and feed prices for May over the 3 day period January 27-29.

Calculating Feed Equivalents

Producers insure the feed that is used to make milk by supplying the total number of tons of corn or corn equivalent and the tons of protein meal or protein meal equivalent that they expect to feed each month. The easy option is just to use the default feed conversions for corn and soybean meal provided by USDA. Default values of 0.014 tons (0.5 bushels) of corn and 0.002 tons (4 pounds) of soybean meal per hundredweight of milk can be used if producers do not wish to choose feed amounts. If they choose, milk producers can convert their feedstuffs into corn and soybean meal equivalents. The maximum amount of corn or soybean meal is bounded in relation to milk production according to figures supplied by USDA (the number of tons of corn or corn equivalent must be between 0.00364 and 0.02912 tons per hundredweight of milk; the number of tons of protein meal or protein meal equivalent must be between 0.000805 and 0.006425 tons per hundredweight of milk). To convert feedstuffs into corn or soybean meal equivalents one must use the LGM-Dairy Commodity Exchange Endorsement table which contains suggested feed conversion rates (see appendix).

The expected cost of feed (using a producers feed records) is computed as follows:

Expected cost of feed = Corn equivalent*(2000/56)*CBOT corn daily settlement prices + Protein meal equivalent*CBOT soybean meal daily settlement prices

The expected milk price is computed as follows:

Expected milk price = CME milk futures daily settlement prices

The expected gross margin therefore is defined as follows:

Expected Gross Margin = Approved Target Marketings*Expected Milk Price – Expected Cost of Feed

The definition of Approved Target Marketings is the maximum amount of milk that may be stated as target marketings on the application. Obviously a producer cannot exceed the milk capacity of his operation. The producer may also elect to insure less than capacity.

Computing the Gross Margin Guarantee

The gross margin guarantee for each 10-month coverage period is calculated by subtracting a deductible amount from the expected total gross margin for the application insurance period. The expected total gross margin is equal to the sum of the expected gross margins for each month during the insurance period. The deductible is therefore the portion of the expected gross margin that the producer elects not to insure. Allowable deductible amounts are zero to \$1.50 per cwt in \$0.10 per cwt increments. The total deductible is calculated by multiplying the per cwt deductible times the approved target marketings.

For example, if approved target marketings are 1,560 cwt. of milk for a particular month, the expected milk price is \$12 per cwt, and expected feed costs are \$2,437.50, then the Expected Gross Margin is equal to \$16,282.5 (1560X\$12 – \$2437.5). If a producer elects a \$0.10 per cwt deductible, then the Gross Margin Guarantee is \$16,126.50 (\$16,282.50 – (\$0.10 X 1560)).

Actual or Closing Prices

In terms of closing or actual prices, this is the simple average of futures prices during the last three days prior to settlement for a particular contract month. Again, if there is no contract for the closing month (e.g. for corn and soybean meal), then the price used is equal to a weighted average of the prices in the immediate surrounding months (using the simple average of the daily settlement prices during the last three trading days).

Thus the same formulas used to compute the expected prices and gross margin are used in the calculation of the actual or closing gross margin. The same volume for milk and feed used in the expected gross margin formula is used in the actual gross margin. The only difference is that closing futures contract prices are used in the actual gross margin. Thus the only change that occurs is in the futures prices. The actual total gross margin is calculated by summing the actual gross margins for each month of an insurance period.

Indemnities

Indemnities that are to be paid to milk producers will be equal to the difference between the gross margin guarantee and the actual total gross margin (less the selected deductible, if any) for the insurance period. In our earlier example we computed that the gross margin guarantee (after the

deductible) was equal to \$16,126.50. Suppose actual milk prices fell and grain prices rose? If milk prices fell to \$10 per cwt and total feed costs rose to \$2,514.29, then the actual gross margin would be \$13,085.71 (1560 X \$10.00 - \$2514.29). The indemnity payment would then be \$3040.79 (\$16,126.50 - \$13,085.71).

Comparing the LGM Program and Traditional Risk Management Programs

Dairy producers have a number of options available for managing price risk. These include forward pricing, hedging, options, and the Dairy LGM program. In some cases producers may want to select one method and use this to protect their income or gross margin. In other cases, producers may want to use the Dairy LGM on a certain percent of their milk supply, then use either forward pricing or hedging/options on another percent. The decisions about whether to hedge and the amount of milk to hedge and the combination of approaches are up to the individual producer.

The LGM Program has advantages and disadvantages just like the other risk management tools discussed above. These advantages and disadvantages are outlined below:

Advantages: deals with both milk and feed, protects the gross margin, focuses on changes in futures prices, and provides a clear settlement process. It does not prevent a producer from realizing the upside of the market. The program is very flexible, can insure some or all of your milk, has a monthly instead of annual sales closing, and a range for the deductible.

Disadvantages: can elect to participate only once per month during certain hours, requires producers to compute their feed requirements in terms of corn and soybean meal in advance (assuming they don't use the default ration), the cost of LGM insurance is substantial and is not subsidized, you cannot exit the program if market conditions change, it does not provide any basis protection to the event that your farm gate milk price or corn/soybean meal prices deviate from reported CME prices.

As a final note, milk producers should not let the complexity of these programs or the disadvantages of these programs deter them from seeking greater protection against adverse price movements. Milk producers can better protect themselves by developing a marketing plan and using one or more of these tools for a fixed percent of their milk supply. Our analysis is that the LGM has the advantage of focusing on the gross margin for milk producers. This is important given the volatility in feed costs. However, the cost of the insurance should be weighed against the price protection offered. In addition, LGM should be carefully compared to other risk management tools.

Program Performance to Date

The Pennsylvania program has recent results that are available to show how a Dairy LGM contract would have performed had it been purchased on various dates. Figure 1 compares the actual gross margin (AGM) to the expected gross margin (EGM). The yellow line shows the actual gross margin. The various other lines show the expected margins insurable at the various decision dates. Since milk prices fell

sharply for much of 2009, all policies look attractive looking backwards. Of course the cost of the insurance must be deducted from this gain before any conclusions could be reached. Still, the results over the period shown are very significant.

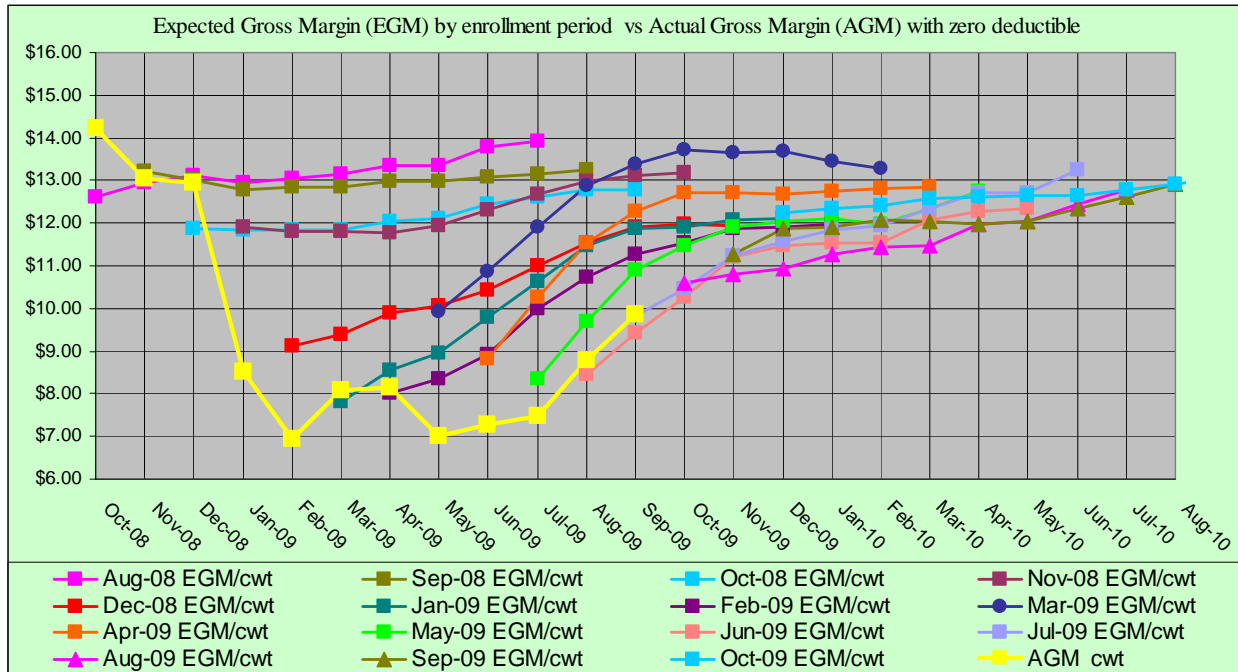


Figure 1.

Appendix Table 1. Suggested Conversion Rates for Dairy Feeds, Based on Protein and Energy Content per Ton

	Soybean Meal Ratio	Corn Ratio
Barley	0.111	0.866
Blood meal	2.025	-1.235
Brewer's grain, dry	0.433	0.357
Brewer's grain, wet (21% DM)	0.099	0.081
Brewer's grain, wet (40% DM)	0.188	0.155
Corn, shelled	0.000	1.000
Corn and cob meal (ear corn)	-0.007	0.985
Corn gluten meal, dry	1.408	-0.420
Corn gluten feed, dry	0.304	0.597
Whole cottonseed	0.323	0.850
Cottonseed meal (41% CP)	0.905	0.036
Cottonseed meal (36% CP)	0.867	0.015
Distiller's grain with	0.394	0.686

solubles, dried (92% DM)		
Distiller's grain with solubles, wet (60% DM)	0.257	0.447
Feather meal	1.600	-0.743
Fish meal, herring	1.875	-0.865
Fish meal, menhaden	1.651	-0.768
Hominy	0.057	0.977
Meat meal	1.227	-0.349
Meat and bone meal	1.426	-0.555
Molasses, cane, dry	0.075	0.791
Molasses, cane, wet	-0.037	0.747
Oats	0.120	0.779
Peanut skins	0.265	0.439
Whole soybeans	0.836	0.279
Soybean meal	1.000	0.000
Soyhulls	0.100	0.819
Thin stillage (slop) (6% DM)	0.026	0.045
Wheat	0.161	0.884
Wheat bran	0.235	0.585
Wheat middlings	0.274	0.523