

Dairy Keeper News & Information Notice 2009

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News & Information Notice Subject: - Milk and Feed Prices

Milk and feed prices are extremely volatile from one month to the next and can have an adverse impact on a dairy farm's gross profitability. If milk prices fall and feed costs rise, farm profits can be squeezed. In some years, milk prices can be very low, resulting in a need to more carefully monitor feed costs to maintain profits. In other years, milk prices could increase as a result of market spikes in feed costs, which also require careful monitoring since milk prices may not rise fast enough to keep up with higher feed costs.

Despite common knowledge, dairy producers control milk prices and feed costs. Both milk prices and feed costs can be forward contracted through a milk cooperative and a feed grain supplier. Farms that are large enough can also directly contract for milk and feed costs through a commodity broker. In addition, dairy producers are responsible for developing a feed budget, purchasing feed inputs, and delivering that feed to their herd in an economically efficient manner. Thus, feed costs, which are between 40 and 60 percent of the total cost of producing milk, are clearly controlled by the dairy farm manager. The key is to develop a system to monitor and budget milk prices and feed costs in order to have some degree of control over gross profits. In this report, two measures are developed to monitor milk prices and feed costs.

One is called *income over feed costs* (IOFC), which is measured in dollars per cow per day. The other is called the *milk margin* (MM), which is measured in dollars per hundredweight (cwt) per day. Both reflect the difference between the price of milk and the cost of the feed to make that milk. While IOFC is on a per-cow, per-day basis, the milk margin is on a per cwt basis. Dairy producers probably will be more inclined to monitor and measure IOFC, whereas other market participants (e.g., those trading futures contracts in Chicago, processors, government) will be more interested in the milk margin. That said, one is simply a mathematical transformation of the other; when one goes up, so will the other. Thus, for purposes of exposition, the rest of this publication will focus on IOFC.

Measuring Milk and Feed Costs

There are various ways to measure milk and feed costs. USDA has a measure called the *milk-feed ratio*.

According to USDA, the milk feed ratio is the number of pounds of 16 percent protein-mixed dairy feed equal in value to 1 pound of whole milk. The methodology uses major raw feed component prices from *Agricultural Prices*, published by USDA's National Agricultural Statistics Service (NASS). The major feed components of corn and soybeans account for 83–91 percent of the total ingredients in the rations. The formal definition for this formula is as follows:

$$FV = (51/56) \times PCorn + (8/60) \times PSoy + (41/2000) \times PHay$$
$$\text{Milk-feed ratio} = PMilk/FV$$

FV is feed value (\$/cwt), PCorn is the price of corn (\$/bu), PSoy is the price of soybeans (\$/bu), PHay is the price of alfalfa hay (\$/ton), and PMilk is the U.S. all-milk price (\$/cwt).

The problem with this ratio is that it is not very intuitive. As an index, it is simply a ratio of two numbers. But how can milk producers relate this index to their operations? It does not reflect dollars and cents but rather a ratio that is equal to something that can't be readily identified. For example, feed costs during the first quarter of 2007 were rising, as was the price of milk. So what does it mean when USDA reports that the milk-feed price ratio rose from 2.42 in January 2007 to 2.54 in April 2007? How does this relate to a milk producers' bottom line or gross profitability? Will dairy farmers make more or less money in 2007 when both milk and feed costs are rising rapidly? This is an important concern since the entire dairy market, including those who trade futures contracts on the Chicago Mercantile Exchange, want to know if milk producers are making more or less money in the current market environment.

An alternative is to simply take the price of milk and subtract the cost of the feed required to produce that milk. In other words, if a milk producer makes 85 pounds of milk per day, what is the farm price of that milk and what are the costs of producing it? The result is a dollar figure that represents gross profitability for the dairy farm. From this figure, you can pay other costs such as hauling, labor, veterinary expenses, interest, depreciation, and so forth. If this figure rises, so will profitability, and vice versa. It can be measured on a per-cow, per-day basis or on a per-cwt basis as explained earlier. IOFC is measured on a per-cow basis and is defined as follows:

$$IOFC (\$/cow/day) = P_{milk} \times (DAMP/100) - DFC$$

Pmilk is the all-milk price (\$/cwt), DAMP is daily average milk production(lbs/cow/day), and DFC is daily feed costs (\$/cow/day). DFC is the daily cost of feedstuffs required to produce the amount of milk reflected in DAMP. Essentially, the all-milk price is being converted from dollars per cwt to dollars per pound of milk produced, and then the cost of producing that milk is subtracted. The milk margin is measured in dollars per cwt and is defined as follows:

$$MM (\$/cwt) = P_{milk} - DFC \times 100 / DAMP$$

Feed costs are converted from a cost per cow to a cost-per-cwt basis. As indicated, these measures of gross profitability (both IOFC and MM) are very different from USDA's measure of the milk margin because the latter reflects the cost of 100 pounds of feed—not the feed cost of producing milk. One limitation with the measure of gross profit (both IOFC and MM) is that it only reflects the feed costs for the milking cow, which is roughly 34 percent of the milk's value. This does not include feed for dry cows and dairy replacements. If these feed costs were included, the cost of feed would represent 45–60 percent of the value of milk.

Feed Rations

The concept of IOFC seems reasonable: develop a dollar-andcents measure of gross profitability for the milk producer. All market participants, including milk producers, coop managers, processors, milk futures traders, retailers, and so on, will be able to relate to this simple measure of profitability. But how much detail is necessary when developing a way to measure feed costs? Dairy feed rations basically consist of three parts: forages (hay, corn silage, haylage), concentrates (corn, soybean meal, minerals), and by-products (wheat midds, distillers grains). Rations are balanced to produce a certain level of milk production and milk components (milk fat, protein, lactose/minerals).

Thus, many combinations of feedstuffs can be used to produce a balanced ration. The USDA ration used to compute the milk-feed ratio is very simple. It uses monthly USDA NASS reported prices for corn, soybeans, and alfalfa hay to compute the cost of 100 pounds of a 16 percent protein dairy feed ration. NASS used *Morrison's Feed and Feeding Manual* and computed that 100 pounds of 16 percent feed should contain 51 pounds of corn, 8 pounds of soybeans, and 41 pounds of alfalfa hay. The problem with this ration is that while it is very simple, it is not representative of an actual dairy ration since most milk producers feed soybean meal, not just soybeans (some use roasted soybeans), and most rations also consist of byproducts.

For this study we designed a feed ration for a Pennsylvania farm that purchases alfalfa/grass haylage, corn silage, corn grain, 48 percent soybean meal, distillers grain, soybean hulls, roasted soybeans, and a mineral mix. This ration was called the *PA Complex* ration (Table 1). Rations were formulated for cows averaging 65, 75, or 85 pounds of milk with a 3.7 percent milk fat and 3.0 percent milk protein. Dry matter intake was estimated using the 2001 National Research Council (NRC) model. All rations contained approximately 50 percent forage and 50 percent concentrate on a dry matter basis.

Historical feed prices were obtained from the Penn State feed price list, which is published monthly. This list compiles prices from the grain market summary of the Pennsylvania Department of agriculture, *Feedstuffs* magazine, and the *Keystone Dairy Digest*. The IOFC measure uses both the price of milk and the cost of feed. The Pennsylvania all-milk price used was reported by NASS. The measure IOFC is simply the Pennsylvania all milk price less the cost of feed. Next we designed a Pennsylvania ration for the same levels of milk production and milk components but instead used just alfalfa hay, corn, and 48 percent soybean meal.

The idea was to compare the IOFC for this very simple ration to the more complex ration. We called this the *PA Simple* ration. Finally, a ration was designed to mimic the USDA's milk-feed ratio. This ration was designed to use Chicago prices for corn, soybean meal, and alfalfa hay. On an "as fed basis" this ration used 22.22 pounds of corn grain, 2.52 pounds of 48 percent soybean meal, and 25.5 pounds of alfalfa hay to produce 65 pounds of milk. For the milk price we used the U.S. all-milk price. This was called the *US Simple* ration. Again, IOFC was computed using the ration costs and the U.S. all-milk price.

Thus, three measures of IOFC were computed for this study using the feed rations identified above. The first is PA Complex, which is equal to the Pennsylvania all-milk price less the PA Complex feed ration. The second is PA Simple, which uses the Pennsylvania all-milk price less the PA Simple feed ration. The last is US estimated correlation coefficients are presented in Table 2. The results indicate that the three measures of IOFC for Pennsylvania and the United States are highly correlated, having estimated correlation coefficients greater than 97 percent. The milk-feed ratio is also highly correlated with our measures of IOFC, having correlation coefficient estimates of 84 to 86 percent.

Benchmarking IOFC

In order to operate a profitable business and make sound business decisions, IOFC is an easy benchmark to monitor. It is affected by feed expense, milk production, and milk price. The goal should be to maximize IOFC. This does not mean the answer is to focus strictly on reducing feed costs when feed costs are high. If milk production is compromised due to low out-of-pocket feed costs, IOFC can be further reduced, lowering overall farm profitability. Maximizing IOFC may require evaluating different feeding strategies and following the expertise of a nutritionist to make good decisions. An achievable goal for IOFC at 65 pounds of milk per day is \$6.00 or

higher. In cases where milk prices are low and feed costs high, a range of \$5.00 to \$5.50 should be attainable. Profitable dairy producers can achieve IOFC measures of greater than \$7.00. Because each farm is different and has varying debt loads, the IOFC to maintain a farm's profitability may need to be higher than the benchmarks. Producers should carefully calculate IOFC each month as milk production, milk price, and feed costs change. Benchmarking this measure against past performance and future goals will help the producer make favorable, economically beneficial decisions for the dairy.

Source: