Controlling Feed Costs: Focusing on Margins Instead of Ratios

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Feed costs are overwhelmingly the largest expense for dairy producers. Feed costs were typically 50% of total costs in years past, but now are 60+%. With these escalating costs, producers and nutritionists are closely evaluating the feeding program to identify opportunities to improve efficiencies. There are many places to look, and many measures and metrics are available.

What is the best measure of feeding economics? Is a ratio or a margin more appropriate? There are a variety of ratios used in the dairy industry to evaluate feeding economics, and they are misleading or inaccurate if used inappropriately. Examples include milk price to feed price (USDA Milk:Feed ratio), dry matter intake to milk production (milk:feed), and feed cost per cwt. Income Over Feed Cost (IOFC) is the most common margin used to measure feeding economics. While margins are nearly always preferred over ratios, both can be misinterpreted. Understanding how they are calculated and interpreted helps avoid misuse and mistakes.

Milk-Feed Ratio

The Milk-Feed ratio is simply the pounds of 16% total ration equal to 1 lb of milk, or the ratio of milk price to feed price. Feed price is determined using market values for a ration containing 51% corn, 8% soybeans, and 41% alfalfa hay. For example, if milk price was $0.20/lb and the 16% ration was $0.10/lb, the ratio would be 2.0. Table 1 illustrates several examples in various market conditions, with each successive row in the table escalating to higher feed and milk prices. In this example, when both milk and feed prices rise, the ratio declines but the margin improves. A higher margin means more profit, so in this case the ratio is misleading. The Milk-Feed ratio is a poor measure of feeding economy, and has little to no utility.

Feed Cost/cwt the Right Way

Calculated the correct way on financial statements (accrual usage of feed consumed by milking and dry cows divided by cwts milk shipped), feed cost/cwt provides a long term picture of how good of a job the dairy did in converting feed dollars to saleable hundredweights of milk. It does not include heifers, but is impacted by many factors including price paid for feed, shrink, refusals, hospital, efficiency of converting feed into milk, dry cow numbers, and dry period lengths. Management

factors such as reproduction, milk per cow, days in milk, facility design, cow comfort, milking frequency, etc impact as well. If feed cost per cwt on the financial statement is too high, there are many places to look for improvement.

The biggest weakness of this number is that it ignores the value of milk. It typically costs more feed to produce higher value milk (higher components or lower SCC). Thus, it is inappropriate to compare feed cost per hundredweight for herds with different component levels or milk quality.

It is important that accrual usage of feed is used to calculate feed cost/cwt. Accrual usage requires measuring delivery (and by proxy consumption) of feed over the period of time the financial statement is constructed. Feeding programs along with monthly inventory adjustments are ideal tools to measure accrual usage of feed. If accrual usage is not used, feed cost/cwt is difficult to measure as the feed consumed may not correspond to the milk shipped, making the calculation irrelevant.

Feed Cost/cwt the Wrong Way

Feed cost per cwt can also be calculated on a cow by cow basis (feed costs per day divided by milk per cow/100). This number has no useful purpose for a dairy. By accident it may lead to correct decisions; just as often it will lead to incorrect decisions.

Income Over Feed Cost

Income over feed cost (IFOC) is a margin that is calculated as (milk revenue per cow per day) minus (feed costs per cow per day). Any management or feeding change that increases IOFC is likely good provided it does not impact cow health. The IOFC is driven by several factors. Obvious are feed price and milk price. Others include feed conversions, milk per cow, and the value of milk (i.e. components and premiums). Day to day feeding and management decisions should be evaluated using income over feed costs. Items like shrink, refusals, hospital, and dry cows are not generally considered by IOFC.

Example: Consider a dairy with the following numbers for the month of January:

- Milking and dry cows consumed $108,000 in feed
- The dairy shipped 10,100 cwts
- Milk cow feed costs were $6.80 per day
- Tank average was 75 lbs
- Milk price was $18/cwt

Measures of Feeding Economics

- ***Feed Cost/cwt*** (the correct way that appears on financial statements)
    - 108,000/10,100 = 10.80/cwt
- ***Feed Cost/cwt*** (the wrong way; often mistakenly used to make decisions)

- $6.80/ (75/100) = $9.07/cwt

- ***Income over Feed Cost***
  - (75*0.18) – 6.80 = $6.70/day

Why not use Feed Cost/cwt the wrong way?

Suppose the dairy above changed the ration to get more milk. Suppose the ration costs increased from $6.80/day to $7.05/day, and milk increased from 75 to 77 lbs.

- Feed cost/cwt (the wrong way) would now be $7.05/ (77/100) = $9.16/cwt.
- Income Over Feed Cost would now be (77*0.18) – 7.05 = $6.81/day

Was this a good change for the dairy? Feed Cost per cwt increased 9 cents/cwt but IOFC increased 11 cent per day. Feed cost/cwt suggests it was a poor decision because feed costs increased. The IOFC suggests it was a good decision because the dairy increased profit. Which is correct? Mathematically both are correct, but feed cost per cwt gave the wrong answer. Of course the dairy should take the profit, provided cow health was not impacted.

Should Market Costs for Home-Grown Feeds be Used?

Many dairies have a farming enterprise that produces some or all of the forages and grains for the dairy. If the success of the dairy is hinged on the farm providing feed below market value, it is an unhealthy business model. If feed markets drop, and the advantage of cheap feed is gone, the dairy will lose its competitive advantage and may be at risk. A healthy dairy business should be able to survive and profit long term using market values for feeds. A farming enterprise is a great business for a dairy to engage in, but should not subsidize the dairy business.

Is IOFC the best measure?

Even though income over feed cost is an ideal tool to measure the impact of management and feeding decisions, it has several potential shortcomings:

- Component changes are often not factored into the equation. In the above examples, fat and protein were not considered, and they have a large economic impact.
- It is not useful to monitor change over time. If IOFC improves, does it mean that the herd improved, or simply that milk price was higher or feed costs were lower? It is impossible to differentiate, so IOFC is a poor barometer of herd performance.

Components Must Be Considered

Milk premiums in most markets are offered for high quality milk (low bacteria and somatic cell counts). In component markets butterfat, protein, and other solids directly impact milk price. Shipping higher value milk is an opportunity for many dairies.

Given how most dairies are paid for their milk, it doesn't make sense to use milk/cow as a measure of performance. For instance, most would agree that a 60 lb cow with 4.8% fat and 3.6% protein is better than a 65 lb cow with a 3.5% fat and 2.8% protein. This seems obvious by looking at the raw numbers and knowing what components are worth. But what about a 71 lb herd with 3.95% fat and 3.26% protein, compared to an 80 lb herd with 3.40% fat and 2.90% protein? Which is better? This comparison is not so simple.

To make comparisons more equitable, we have traditionally used Fat Corrected Milk (FCM) or Energy Corrected Milk (ECM). Both FCM and ECM are designed to relate the energy content of milk. They are strictly based on biology, and have no economic basis. The formulas work the same when protein is $1.00 per pound or $4.00 per pound.

A new measure called Money Corrected Milk^{TM} (MCM) is a milk-check based measure of cow productivity. It considers the economic value of milk components, and the impact of milk check assessments. Similar to ECM or FCM, it is expressed as pounds of milk per cow per day. Instead of relating to the energy contained in the milk, MCM relates to the income derived from the milk produced. In the examples in Tables 2 and 3, MCM is calculated using a 3.5% fat, 3.0% protein, 5.70% other solids basis. The inputs needed include all items that impact the milk check, such as value of fat and protein, quality premiums, hauling, and other assessments.

So which is better, the 71 lb cow with high components, or the 80 lb cow with low components as displayed in Table 3? If tank average is the measure, as it normally is, the 80 lb herd is obviously better. It is also better if FCM or ECM is the measure. If the measure is MCM, the 71 lb herd and the 80 lbs herd are exactly the same. They are both 77.8 lbs of MCM. The MCM is directly related to income per cow per day.

Table 3 also contains a Holstein-Jersey example. The MCM concept is ideally suited to compare economic performance of different breeds. In the example in Table 3, a 78 lb Holstein has the same MCM as a 54 lb Jersey.

Money Corrected Milk^{TM} IOFC uses the MCM concept to provide the best measure of dairy feeding economics. The difference from traditional IOFC is twofold:

- The milk check based approach of Money Corrected Milk^{TM} is used to determine income
- Economic factors (feed price, component prices, and milk check assessment values) are fixed over time.

In Table 3, MCM IOFC is calculated for the Holstein-Jersey comparison. In this example, the Jerseys are generating more milk income after feed costs are covered. That means more revenue to cover other expenses.

By using the Money Corrected Milk^{TM} concept, components and all milk check factors are considered. By fixing prices, any change in Money Corrected Milk^{TM} IOFC is due to changes in cow performance.

Summary

There are many measures of feeding economics used in the dairy industry. In general, margins matter and ratios don't when it comes to feeding economics.

Table 1. Milk:Feed ratio and margin/cwt

Milk, $/lb	16% Dairy	Feed $/cwt[1]	Milk-Feed	Margin[2], $/cwt
$0.15	$0.054	$3.86	2.78	$11.14
$0.18	$0.09	$6.44	2.00	$11.56
$0.21	$0.11	$7.87	1.91	$13.13
$0.24	$0.13	$9.30	1.85	$14.72
$0.25	$0.14	$10.02	1.79	$14.99

Table 2. Inputs for Money Corrected Milk™ calculation

Item	Value
Butterfat, $/lb	$2.50
Protein, $/lb	$3.00
Other solids, $/lb	$0.15
Fluid Adjustment, $/cwt	$0.00
Quality Bonus, $/cwt	$0.50
Hauling, $/cwt	$1.00
Advertising and Promotion, $/cwt	-$0.15
Basis, $/cwt	$2.00

Table 3. Herd Comparisons

	Holstein A	Holstein B	Holstein	Jersey
Tank Average	71.0	80.0	78.4	54.1
Fat%	3.95	3.40	3.00	5.00
Protein%	3.26	2.90	2.70	3.70
Other Solids%	5.70	5.70	5.70	5.70
FCM	75.4	78.9	73.0	65.4
ECM	75.4	77.3	70.6	66.4
MCM™	77.8	77.8	70.0	70.0
Income/day	$15.52	$15.52	$13.96	$13.96
DMI			51.5	49.5
MCM™ IOFC[1]			$6.23	$6.53

[1] $0.15/lb DM TMR cost