MAKING MILK

By Kathy Barrett and Jason Karszes

Impact of components on milk price

A dairy farm's net milk price is the largest source of income on the dairy. PPD, premiums, deductions patronage and milk contracting all impact the milk price received on farm, but component value is by far the greatest driver. For the average dairy farm milk components comprise over 90% of the net pay received. Consequently a change in milk composition has a direct and significant impact on milk price.

Components comprise 90% of net pay but price per cwt varies widely.

The Cornell Dairy Business Summary program collects milk check data for several hundred farms across New York State. An analysis from that project revealed that there is a wide variation in milk component price per cwt across dairies. The range of component milk price goes from $18.36 on the low end to $19.64 on the high end. That's a difference of $1.26 per cwt. Breaking that down further by percent butterfat and percent protein it's possible to see where the variation comes from. Percent butterfat ranged from a low of 3.61 to a high of 4.03. This alone accounts for a $ .67/cwt difference in milk price. Percent protein ranged from 2.99 to 3.22 resulting in a further difference of $.79/cwt. Since all farms are paid the same amount per lb of butter fat, protein and solids, the price difference is solely explained by the percent components. Table 1 highlights these ranges as each row is sorted independently to show the range across farms. With each row sorted independently the columns don't add up, as it isn't necessarily the same farm in each row for the lowest quintile, but the lowest farms for that measure.

Table 1

MILK PRICE INFORMATION BY QUINTILE[1]
(Each Category Sorted Independently)
101 Large Herd Dairy Farms, 2013

	Lowest Quintile				Highest Quintile
Butterfat, %	3.61	3.73	3.78	3.85	4.03
Protein, %	2.99	3.07	3.11	3.15	3.22
Other Solids, %	5.71	5.74	5.76	5.78	5.84
Butterfat, $ per Cwt.	6.02	6.21	6.30	6.41	6.69
Protein, $ per Cwt.	9.88	10.14	10.27	10.39	10.67
Other solids, $ per Cwt.	2.28	2.31	2.32	2.33	2.35
Total Component Value per Cwt.	**$ 18.36**	**$ 18.66**	**$ 18.85**	**$ 19.05**	**$ 19.64**

For every .01 percentage point increase in butterfat and protein there is a correlating increase in milk price. The dollar value of that increase is contingent on the component price per pound being paid, which varies from month to month and year to year. Tables 2 and 3 illustrate the change in milk price that can occur as composition changes for different prices per pound of component. At a butterfat price per pound of $1.10 every .01 percentage point increase adds $.011 to the milk price (Table 2). So increasing percent butterfat from 3.40% to 3.45% adds $.06, to 3.70% adds $.33 and to 4.10% adds $.77 per cwt. This is significant at even this low price per pound of butterfat. At a butterfat price per pound of $2.90, each .01 percentage point increase adds $.029 to the milk price, or for an increase of .10 in the butterfat % adds $0.29 per cwt to the milk price.

The relationship is the same for protein. However, the protein price per pound has generally been higher than the butterfat price, so the change per point of improvement is larger (Table 3). At a protein price per pound of $3.00, for every .01 increase in the percent, the milk price increases by .03 cents. So if management can improve % protein from 2.95 to 3.05, the milk price per cwt would increase by $0.30.

Table 2

Impact of % Butterfat on Component Value of Milk Price
Change in Milk Price, Per Price Per Pound

	Price per Pound of Butterfat									
% Butterfat	$1.10	$1.30	$1.50	$1.70	$1.90	$2.10	$2.30	$2.50	$2.70	$2.90
3.40	3.74	4.42	5.10	5.78	6.46	7.14	7.82	8.50	9.18	9.86
3.45	3.80	4.49	5.18	5.87	6.56	7.25	7.94	8.63	9.32	10.01
3.50	3.85	4.55	5.25	5.95	6.65	7.35	8.05	8.75	9.45	10.15
3.55	3.91	4.62	5.33	6.04	6.75	7.46	8.17	8.88	9.59	10.30
3.60	3.96	4.68	5.40	6.12	6.84	7.56	8.28	9.00	9.72	10.44
3.65	4.02	4.75	5.48	6.21	6.94	7.67	8.40	9.13	9.86	10.59
3.70	4.07	4.81	5.55	6.29	7.03	7.77	8.51	9.25	9.99	10.73
3.75	4.13	4.88	5.63	6.38	7.13	7.88	8.63	9.38	10.13	10.88
3.80	4.18	4.94	5.70	6.46	7.22	7.98	8.74	9.50	10.26	11.02
3.85	4.24	5.01	5.78	6.55	7.32	8.09	8.86	9.63	10.40	11.17
3.90	4.29	5.07	5.85	6.63	7.41	8.19	8.97	9.75	10.53	11.31
3.95	4.35	5.14	5.93	6.72	7.51	8.30	9.09	9.88	10.67	11.46
4.00	4.40	5.20	6.00	6.80	7.60	8.40	9.20	10.00	10.80	11.60
4.05	4.46	5.27	6.08	6.89	7.70	8.51	9.32	10.13	10.94	11.75
4.10	4.51	5.33	6.15	6.97	7.79	8.61	9.43	10.25	11.07	11.89
$ Per Point Increase	$0.011	$0.013	$0.015	$0.017	$0.019	$0.021	$0.023	$0.025	$0.027	$0.029

Table 3

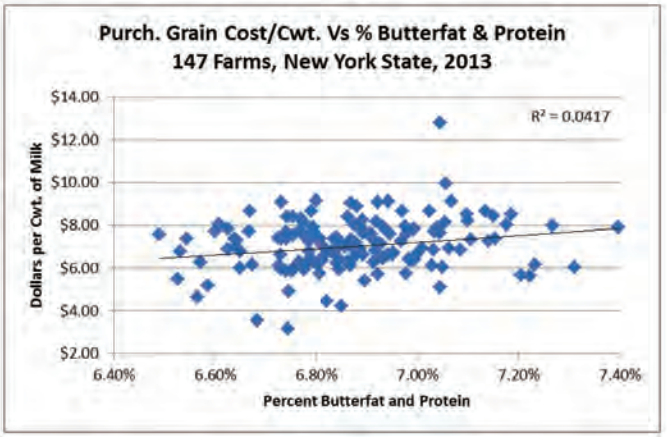
Impact of % Protein on Component Value of Milk Price
Change in Milk Price, By Price per Pound

	Price per Pound of Protein									
% Protein	$1.60	$1.80	$2.00	$2.20	$2.40	$2.60	$2.80	$3.00	$3.20	$3.40
2.80	4.48	5.04	5.60	6.16	6.72	7.28	7.84	8.40	8.96	9.52
2.83	4.53	5.09	5.66	6.23	6.79	7.36	7.92	8.49	9.06	9.62
2.86	4.58	5.15	5.72	6.29	6.86	7.44	8.01	8.58	9.15	9.72
2.89	4.62	5.20	5.78	6.36	6.94	7.51	8.09	8.67	9.25	9.83
2.92	4.67	5.26	5.84	6.42	7.01	7.59	8.18	8.76	9.34	9.93
2.95	4.72	5.31	5.90	6.49	7.08	7.67	8.26	8.85	9.44	10.03
2.98	4.77	5.36	5.96	6.56	7.15	7.75	8.34	8.94	9.54	10.13
3.01	4.82	5.42	6.02	6.62	7.22	7.83	8.43	9.03	9.63	10.23
3.04	4.86	5.47	6.08	6.69	7.30	7.90	8.51	9.12	9.73	10.34
3.07	4.91	5.53	6.14	6.75	7.37	7.98	8.60	9.21	9.82	10.44
3.10	4.96	5.58	6.20	6.82	7.44	8.06	8.68	9.30	9.92	10.54
3.13	5.01	5.63	6.26	6.89	7.51	8.14	8.76	9.39	10.02	10.64
3.16	5.06	5.69	6.32	6.95	7.58	8.22	8.85	9.48	10.11	10.74
3.19	5.10	5.74	6.38	7.02	7.66	8.29	8.93	9.57	10.21	10.85
3.22	5.15	5.80	6.44	7.08	7.73	8.37	9.02	9.66	10.30	10.95
$ Per Point Increase	$0.016	$0.018	$0.020	$0.022	$0.024	$0.026	$0.028	$0.030	$0.032	$0.034

The relationship is pretty straight forward. As percent BF and protein per cwt increase, the lbs of BF and protein yielded per cwt increases. Increased pounds of BF and protein multiplied by the component price results in an increased milk price per cwt of milk produced.

The other side of the equation is the cost incurred to increase the percent butterfat and protein. Although not the only cost involved, purchased grain cost per cwt is one cost that may change as components change. Figure 1 indicates that there is a very week relationship between purchased grain costs and percent components. Purchased grain costs/cwt did not rise significantly as the percent butterfat and protein increased.

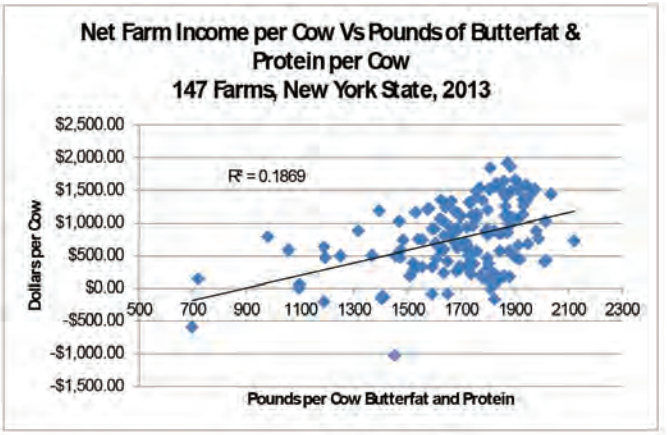
Figure 1



Yet butterfat and protein percentages alone do not tell the whole story on how component levels impact milk revenue and overall profitability. Farms are paid on pounds of components produced, not on the percent components. Milk volume plays a significant role in milk income. When the milk market initially changed to component pricing there was a concern in the industry that volume would have to be sacrificed for higher percent components. Farmers and nutritionists responded by focusing on the balance between milk volume and percent components. Over time it has become apparent that volume does not have to be sacrificed for increased component levels. The challenge is to maintain volume and components at a reasonable feed and other input cost.

Figure 2 shows the relationship between pounds of butterfat and protein per cow and net farm income per cow.

Figure 2



Increasing total pounds of components sold cost effectively is an attainable management goal. Management factors to consider include:

Nutrition program - the industry has learned a great deal in the last ten years about feeding cows for higher components without sacrificing volume. Individual farmers have proved this can be done while still maintaining cost effective feed inputs.

Feeding accuracy - are the cows getting the ration that has been formulated for them? Are there monitoring systems in place to ensure that ration is being mixed correctly, delivered effectively and intake is adequate? How often is the dry matter of feedstuffs checked? Are scales in working order? Are refusals monitored? Is the feeder properly trained?

Cow management impacts how well a cow is able to maximize the nutrition that is provided for her. Are there limiting factors in the cow's environment that can be alleviated through management, such as improved ventilation, appropriate stocking rates, adequate bunk space, and properly trained staff to monitor cow behavior?

Healthy cows in comfortable, well-designed facilities that are consistently well-cared for are the best bet for success. ❐

Kathy Barrett and Jason Karszes are PRO-DAIRY specialists. Email Kathy at kfb3@cornell.edu and Jason at jk57@cornell.edu.