Variation in Feed Costs Among Dairy Farms

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Introduction

The majority of milk marketed by dairy farmers in the United States is sold as a commodity, with dairy farmers acting primarily as price-takers in the marketplace. With the shift of the industry from a system of stable and predictable prices dictated by legislation, to prices driven by market supply and demand, milk prices are now subject to wide fluctuations characterized by intermittent highs followed by lingering lows. In the last 10 years (2007 to 2016), the Class III milk price averaged $16.81/cwt, ranging from a high of $22.34/cwt in 2014 to a low of $11.36/cwt in 2009, a range of $10.98/cwt. Monthly Class III prices exhibited an even wider range, from a low of $9.31/cwt in February of 2009, to a record high of $24.60/cwt in September 2014.

This volatile business environment has caused increased scrutiny of costs of production at the farm level, intensifying when milk prices are in the bottom of the price cycle. With feed costs for many Ohio dairy farms comprising at least 50% of total direct and indirect costs (Table 1), they are under constant scrutiny. Evaluation of feed costs frequently includes comparison to other farms or industry benchmarks. Many states have dairy farm business analysis programs that publish feed cost data. Average 2015 feed costs reported in the Summary of Illinois Farm Business Records (Krapf et al., 2016), New York Dairy Farm Business Summary (Knoblauch et al., pending), the Northeast Dairy Farm Summary (Laughton, 2016) and the Ohio Dairy Farm Business Summary (Shoemaker, 2016) were $9.18, 8.25, 8.51, and 11.88/cwt, respectively. Does this mean that New York dairy farmers are better at controlling feed costs than the Illinois, Northeast, and Ohio dairy farmers? Not necessarily. To use these numbers to help dairy farmers, it is important to understand why they are different.

Evaluating Feed Costs

What is being measured?

The term "feed cost" has many potential meanings in the dairy industry. In any given discussion, it might be referring to the total cost of a diet, or it might include only a fraction of the cost of the diet, such as the supplement portion, purchased feeds, forages, raised feeds, or some combination of ingredients. To be meaningful, it must be clear what costs are included in the measurement being discussed.

What animal groups are included?

Feed costs might be for a specific diet for one group of animals or could include multiple diets for multiple animal groups. Not understanding which diets are included in stated costs of production can result in comparison of

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one farm's total feed cost to another farm's cost of feeding lactating cows, resulting in frustration and potentially bad decisions for all involved. In the Illinois, New York, Northeast, and Ohio dairy summaries, reported feed costs represent all feeds fed to the adult and replacement animals by the farms. However, it should be noted that in the case of animals that are provided feed through a custom raising arrangement, that animal group's feed costs are most likely included in the total cost of production as a contract production expense but not as part of the total feed cost.

How are costs measured?

When a nutritionist formulates a diet, the cost of the diet should also be calculated. How should the feed ingredients be valued? Purchased feeds are the most straightforward and should be valued at their purchase price plus any associated transportation and storage costs. If the diet includes forages or grains grown on the farm, how should those feeds be valued? There are 3 options. Raised feed can be valued at the farm's cost of producing the feed ingredient, they can be valued at a local market price, or they can be valued at a number that represents neither. If the feeds are valued at the farm's cost of production, is it a cash cost of production, an accrual adjusted direct cost, or a total cost of production (accrual adjusted direct and indirect costs) with or without a charge for the value of labor and management? While cash costs of production (typically seed, fertilizer, chemicals, and perhaps other crop supplies) are more readily available, they will under-represent the actual cost of the feed. When market prices are used to value homegrown feeds, they are highly likely to under or overstate the farm's true cost of production. When randomly picking a number to represent an ingredient cost, the resulting feed cost has no value and can harm the farm's ability to make effective management decisions.

These are very important decisions as trying to compare feed costs within and between farms will only be useful if comparisons are made using similarly calculated costs. Valuation of feeds explains some of the differences in feed costs reported by the different summaries. It is important to understand how each state gathers and summarizes information so that comparisons between summaries or with other farm's data is done using costs calculated the same way, or at least recognizing and adjusting for the differences.

Illinois, New York, Northeast, and Ohio summaries report feed costs using accrual-adjusted expenses, meaning the total cost for an expense item is included, not just the cash paid in the reporting year. For example, all seed costs for corn harvested in 2015 would be charged to the corn enterprise whether they were prepaid in 2014, paid in 2015, or not paid until 2016 (or a combination thereof). Only including cash paid in the production year being evaluated can be very misleading and lead to over or under-stating actual production costs.

How state summaries report feed costs

The Illinois Farm Business Records Summary reports dairy farm data broken out by herd size (Table 2). From 2011 to 2015, data was reported for herds with 40 to 79 cows and herds with 80 or more cows. Their feed cost per hundredweight calculation includes purchased feed at purchase price. All raised feed is valued at a set market price per unit representative of Illinois markets. While this method allows a "level playing field" comparison among farms, it does not give participating farms a true cost of production based on their ability, or lack of ability, to grow quality dairy feeds cost-effectively. It is also easier than calculating the cost of production for homegrown feeds.

Cornell publishes several New York dairy farm business summaries, including a summary of all farms and a summary of large herd farms with 300 or more cows. Within summaries, data are broken down by profitability group. The summary of all farms reports average data for all farms and for the high 10%, while the summary for farms with 300 cows or more includes averages for all farms and for the high 20% of farms. High performing farms are sorted by rate of return to all assets without appreciation (Table 3). New York feed costs include dairy grain and concentrate, purchased dairy roughage, purchased non-dairy feeds (heifers and dry cows), fertilizer, lime, seed, spray, and other crop supplies. New York's reported feed costs do not include a charge for crop related machinery, labor, and other costs of producing crops.

The Northeast Farm Business Summary reports data for all farms and for the high 25% of farms sorted by rate of return on assets (Table 3). Their feed cost calculation includes purchased feed, seed, plants, fertilizer, chemicals, and spray. Like the New York data, the Northeast summary data does not include the total costs of crop production.

The Ohio feed costs are the most representative of total feed costs of all the states. Data are reported for all herds and for the high 20% sorted by net return per cow (Table 3). Purchased feed is included at purchase price. All raised feed is included at total cost of production including direct and overhead costs, as well as a return to the farm's labor and management. Direct costs include seed, fertilizer, chemicals, crop insurance, drying, storage, fuel and oil, repairs, custom hire, hired labor, land rent, machinery leases, operating interest, and miscellaneous expenses. Overhead costs include farm insurance, property taxes, utilities, dues and professional fees, machinery, and building depreciation expenses.

Ohio's feed costs also capture the cost of shrink as the amounts of feed fed are calculated for each feed as follows: Feed Fed = Beginning Inventory + Quantity Purchased + Quantity Raised – Quantity Sold – Ending Inventory. While any feeds purchased are valued at the purchase cost, the amount that was raised will be valued at the total cost of production divided by the amount fed. If shrink is an issue before feeding, the total volume of feed fed will have a higher cost per unit as the total costs of production will be divided among the volume of the crop actually making it into the inventory as raised feed. If shrink is an issue between storage and the bunk, the cows will be charged for volume of feed that was available to be fed, whether they actually received and ate it or it was lost to shrink before they were able to consume it. It is important that farms carefully track yields and take accurate inventories for the beginning and ending inventories.

Impact on profitability

There is not a specific feed cost benchmark that will guarantee a farm's profitability. With total feed costs averaging 50% or more of total direct and indirect costs of production (Table 1), feed costs should be evaluated in the context of the dairy enterprise's profitability (Figure 1). While there is a trend indicating that lower feed costs are related to increased net returns, lower feed costs do not guarantee profitability. Ohio's feed cost averaged $11.88/cwt of milk in 2015 (37 conventional and 3 organic herds); it is important to note that achieving a feed cost at or below the average does not guarantee that a farm will achieve a high or even a positive net return per cow. Each diamond in Figure 1 represents one of the 37 conventional dairy farms participating in the 2015 analysis program. There were 8 farms with a feed cost near $11.50/cwt. Three of the farms experienced a negative net return per cow, while 5 realized positive net

returns ranging from less than $200 to around $650 per cow. The same is true if we look at farms with a positive net return per cow. Five farms achieved a net return between $250 to $300 per cow. There was a difference of more than $5/cwt in these farms' total feed costs, ranging from $11.50 to 16.90/cwt.

Conclusions

Today's dairy farms are operating in a volatile marketplace. The bottom line for a dairy enterprise is the net return generated per cow (Table 4). Feed costs make up at least half of the total direct and indirect costs of producing milk on most dairy farms and have the single biggest impact on net return per cow. Because feed costs are a major production cost, monitor it regularly, compare to goals, and evaluate at least once a year in relationship to the profitability of the dairy enterprise. Care should be taken when calculating ration costs and feed costs and comparing with benchmarks or other farms' performance. These comparisons are very useful if it is clearly understood what diets and animal groups are included in the feed cost calculations and how costs are determined for both purchased and raised feeds. Making comparisons and management decisions without clear knowledge of these factors can lead to wasted time and poor results. An individual farm's participation in farm business analysis programs provides excellent data for monitoring and comparison as all participating farms' costs are calculated in the same manner.

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Table 1. Average expenses ($/cwt) and percent of total direct and indirect expenses, for 39 Ohio farms, and high 20%[1] of farms, Ohio, 2015[2].

	All Farms	%Total Expenses[3]	High 20%	% Total Expenses
Feed	$11.88	55.46	$10.42	57.88
Hired labor	2.44	11.40	2.09	11.61
Breeding fees	0.41	1.91	0.31	1.72
Veterinary	0.62	2.89	0.49	2.72
Supplies	0.92	4.30	0.62	3.44
Contract production	0.20	0.93	0.22	1.22
Fuel and oil	0.25	1.12	0.23	1.28
Repairs	0.48	2.24	0.24	1.33
Custom hire	0.69	3.22	0.17	0.94
Utilities	0.48	2.24	0.51	2.83
Hauling and trucking	0.52	2.42	0.46	2.55
Marketing	0.29	1.35	0.28	1.55
Bedding	0.42	1.96	0.40	2.22
Total Direct Expenses	$19.60		$16.42	
Depreciation	0.92	4.30	0.95	5.27
Interest	0.38	1.77	0.24	1.33
Miscellaneous	0.52	2.43	0.38	2.11
Total overhead expenses	$1.82		$1.58	
Total direct and overhead expenses	$21.42		$18.00	

[1]Farms sorted by net return per cow.
[2]Shoemaker, 2016.
[3]Percent of total direct and overhead expenses.

Table 2. Average dairy feed cost, number of herds, and average number of cows, 2011 to 2015, Illinois Farm Business Records[1].

Year	2011		2012		2013		2014		2015		5 Year Avg.	
Herd size (Cows)	40 to 79	80+	40 to 79	80+	40 to 79	80+	40 to 79	80+	40 to 79	80+	40 to 79	80+
Number of herds	9	21	12	24	9	30	9	27	7	29		
Number of cows	62	231	64	232	69	210	64	217	58	210		
Feed cost ($/cwt)	15.10	10.57	16.85	12.35	14.81	13.06	12.73	11.06	10.70	9.09	14.11	11.23

[1]Krapf et al. (2016).

Table 3. Feed costs ($/cwt) as reported by Ohio[1], New York,[2,3] and Northeast[4] dairy farm business summaries, average of all herds, average of high performing herds, 5-year average, and average number of farms.

	Ohio		New York (All Farms)		New Y ork (>300 Cows)		Northeast	
Year	All Farms	High 20%	All Farms	High 10%	All Farms	High 20%	All Farms	High 25%
2015	11.88	10.24[5]	8.25	7.55	8.24	7.75	8.51	8.25
2014	13.03	11.36	9.12	8.83	9.09	8.80	9.54	8.88
2013	12.10	11.31	8.17	7.59	8.89	8.56	9.36	8.68
2012	11.78	10.45	8.52	7.86	8.53	8.01	9.01	8.42
2011	10.88[6]	9.55[6]	7.62	6.84	7.56	7.19	8.07	7.52
5 year average	11.93	10.58	8.34	7.73	8.46	8.06	8.90	8.35
Number of farms	37		174		109		481	

[1]Shoemaker et al. (2012 to 2015). High 20% sorted by net return per cow.
[2]Knoblauch et al. (2012 to 2015). High 10% sorted by return on assets without appreciation.
[3]Karszes et al. (2012 to 2016). High 20% sorted by return on assets without appreciation.
[4]Laughton et al. (2012 to 2016). High 25% sorted by return on assets without appreciation.
[5]Conventional (non-organic) herds only.
[6]Homegrown feeds valued at Ohio market prices.

Table 4. Net Return ($/cow) as reported by Ohio[1], New York[2], and Northeast[3] dairy farm business summaries, average of all herds, average of high performing herds, 5-year average, and average number of farms.

	Ohio		New York (All Farms)		New York (>300 Cows)		Northeast	
Year	All Farms	High 20%	All Farms	High 10%	All Farms	High 20%	All Farms	High 25%
2015	36	1,046	235	833	227	744	138	448
2014	1,266	1,976	1,676	2,330	1,701	2,259	1,314	883
2013	544	1,501	911	1,488	915	1,489	613	989
2012	231	1,145	663	1,273	669	1,175	765	1,294
2011	317	1,290	1,139	1,834	1,207	1,790	1,185	1,756
5 year average	479	1,392	925	1,552	944	1,491	803	1,274
Average number of farms	37		174		109		481	

[1]Shoemaker et al. (2012 to 2015). High 20% sorted by net return per cow.
[2]Knoblauch et al. (2012 to 2015). High 10% sorted by return on assets without appreciation.
[3]Karszes et al. (2012 to 2016). High 20% sorted by return on assets without appreciation.
[4]Laughton et al. (2012 to 2016). High 25% sorted by return on assets without appreciation.

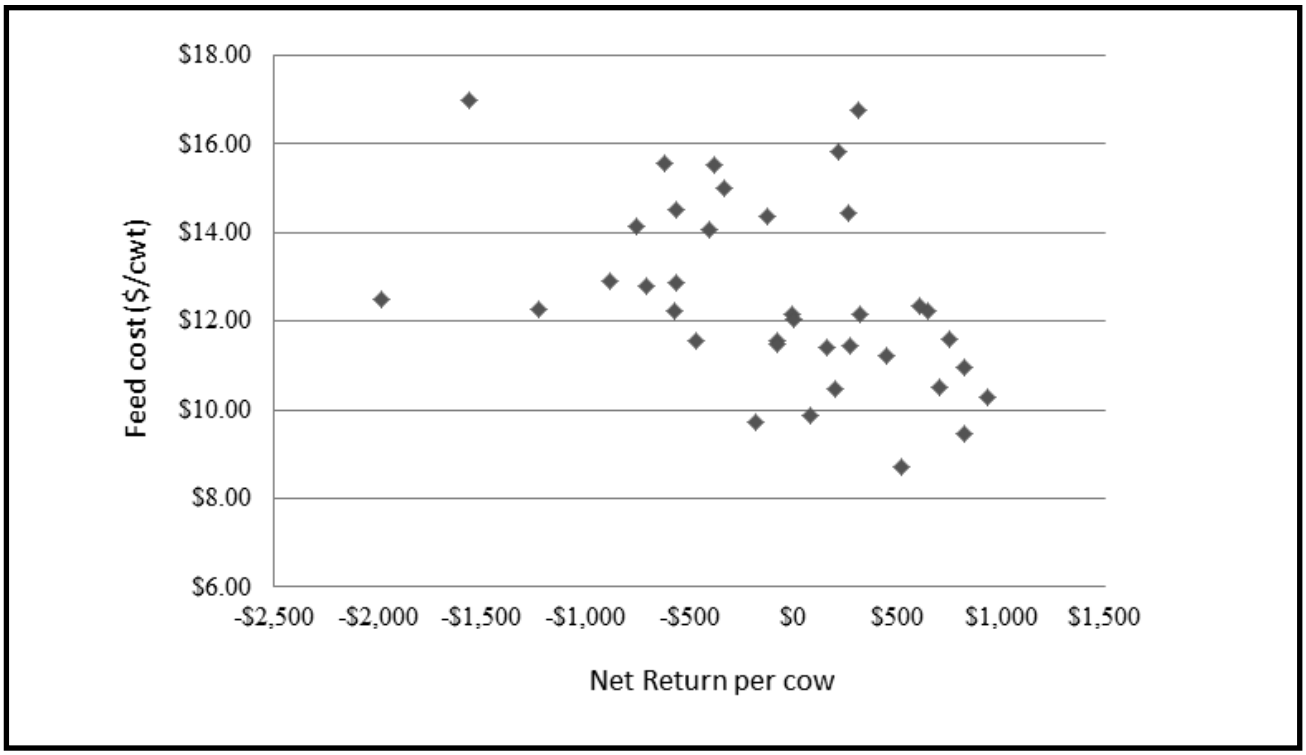

Figure 1. Feed cost versus net return per cow, 37 conventional Ohio dairy farms, 2015 (Shoemaker, 2016).