Staff Paper

COST BY HERD SIZE AND MILK PER COW, 1992

by

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Dairy farmers are in business to make a profit. The core formula to calculate profits is:

+ Income
- Costs
= Profit

We are faced with the reality of steady to decreasing milk prices and cull cattle prices. Income can be increased by keeping more cows, and by getting more milk sold per cow, at least up to the point of diminishing returns. Cost control can play a role. In my discussion I will look at the cost part of this formula.

A group of dairy Telfarmers in 1992 had an economic cost of production which averaged $11.05 per cwt of milk. It was nice that the average price received for milk was $13.44 per cwt. However, in the sample of 200 farms, the cost of production ranged from $5.20 to $20.28 per cwt.

There was little range in the price received. Individual managers with low costs made big profits. Those with high costs suffered big losses. Our goal is to help you plan how to be among those with lower than average costs of production while maintaining a profitable high output.

COST VARIATION WITH SIZE

Throughout the years, college-based accounting systems have shown that larger farms have higher profits, all other things being equal. Lower unit costs have been a contributing factor. Table 1 shows the 1992 Telfarm results when the sample is split into 4 size groups and the profit indicator is management income per cow. This is an economic measure of profit where the operator and unpaid family labor are rewarded with $6.25 per hour and the equity capital is rewarded with 6.0 percent interest. These are "paper," or noncash items. The 2 larger size groups had higher management income and lower cost per hundredweight (cwt.) of milk sold than did the 2 smaller size groups.

Table 1. MANAGEMENT INCOME AND NUMBER OF FARMS
200 Michigan Telfarmers, 1992

Number of Cows	Number of Farms	Management Income	Production Cost/Cwt.
		$ Per Cow	$ Per Cwt.
Less than 65	54	95	12.80
65 - 99.9	55	340	11.49
100 - 149.9	45	584	10.38
150 or more	46	515	10.89

Table 2 shows the livestock costs, summarized into major categories, resulting from averaging all the farms together. Note that feed costs, in this special ranking, are 52 percent of total costs. For this study, it is assumed all feeds are purchased from the crops enterprises on the farm. In other words, cost accounting has been done so as to identify only the costs directly associated with livestock. The cropping activities are left out of the analysis.

Table 2. AVERAGE COSTS PER FARM
LIVESTOCK ONLY
200 Dairy Telfarmers, 1992

Category	Total Farm	Per Cow	Percent of Total
	Dollars		%
Feed Fed	143,957	1,267	52
Livestock Services	52,574	463	19
Labor	39,923	351	15
Power & Equipment	15,590	137	6
Buildings, Improvements	11,932	105	4
Other Costs	8,691	76	3
Land Charges	1,782	16	1

Table 3 shows there is no marked trend in feed cost per cow and milk sold per cow as size increases. The farms with 100 to 150 cows sold the most milk per cow. The 2 smaller herd groups sold less milk per cow.

Table 3. FEED COST AND MILK SOLD PER COW
200 Michigan Telfarmers, 1992

Number of Cows	Feed Cost	Milk Sold Per Cow
	$	lbs.
Less than 65	1,296	16,762
65 - 99.9	1,238	17,736
100 - 149.9	1,280	19,529
150 or more	1,265	19,159

Table 4 shows the details of the total feed costs in Table 3. Notice bigger farms have lower hay costs and higher other feed costs. Other feed is all purchased. It includes protein, salt, minerals and grains.

Table 4. BREAKDOWN OF FEED COSTS IN TABLE 3
200 Michigan Telfarmers, 1992

Number of Cows	Corn, Oats, & Barley	Corn Silage	Hay and Pasture	Other Feeds
		$ Per Cow		$ Per Cwt.
Less than 65	286	152	437	421
65 - 99.9	298	158	358	424
100 - 149.9	294	155	322	509
150 or more	282	153	241	589

Table 5 shows operator labor per cow is quite high on the smaller farms, while hired labor becomes a more important factor on the larger farms. The message is that on smaller dairies how well you manage your own time is a big factor in labor management. Larger farms have likely invested in labor saving equipment. Also, more management attention is needed to supervise the hired labor force if labor costs are to be kept in check and efficiency maintained.

Table 5. LABOR COST PER COW BY SOURCE
200 Michigan Telfarmers, 1992

Number of Cows	Operator	Unpaid Family	Hired	Total
		$ Per Cow		
Less than 65	206	82	102	390
65 - 99.9	116	81	149	346
100 - 149.9	76	73	196	345
150 or more	43	49	257	349

Table 6 shows the machinery investments assigned to crops or dairy production. The trend shows that larger farms have larger machinery investments per acre and per cow. In 1992, the annual costs were also higher on the larger farms.

Table 6. MACHINERY: CROPS VERSUS DAIRY
200 Michigan Telfarmers, 1992

Number of Cows	Crops Items		Dairy Items	
	Invested	Costs	Invested	Costs
	$ Per Acre		$ Per Cow	
Less than 65	85	65	152	126
65 - 99.9	110	84	157	136
100 - 149.9	126	89	169	140
150 or more	152	104	202	141

Table 7 shows 2 cost items that are higher per cow on the 2 larger size farm groups. Health care is made up of veterinary, medicine and drug costs. Bedding makes up the most of the column headed "bedding, DHi and registrations."

Table 7. VETERINARY AND BEDDING COSTS PER COW
200 Michigan Telfarmers, 1992

Number of Cows	Health Care	Bedding, DHI & Registrations
	$ Per Cow	
Less than 65	57.83	49.86
65 - 99.9	54.99	34.38
100 - 149.9	66.59	49.59
150 or more	88.91	73.18

Few costs per cow in 1992 strongly trended downward as size groupings increased. Table 8 shows insurance costs did go down. This includes insurances other than vehicle insurance.

Table 8. INSURANCE COSTS PER COW BY FARM SIZE
200 Michigan Telfarmers, 1992

Number of Cows	Insurance Per Cow
	$
Less than 65	24.83
65 - 99.9	23.03
100 - 149.9	20.83
150 or more	18.21

SIZE VERSUS PRODUCTION LEVEL

Up to this point, I have shown how per unit dairy farm costs vary by size of farm. Rather than get bigger to get more profit, some would rather get better. Better usually means more milk sold per cow. Using this measure, the next few tables show how better herds control their various costs.

COST BY MILK SOLD PER COW

Management income per cow tends to go up as pounds of milk sold per cow increases. The 18 farms with under 14,000 pounds of milk per cow lost $-2 per cow. Those 29 farms with over 22,000 pounds of milk made $740 per cow and earned 33% on their investment. Table 9 shows both these measures of economic profit.

Table 9. MANAGEMENT INCOME AND RETURN ON INVESTMENT, PER COW
200 Michigan Telfarmers, 1992

Pounds of Milk Sold Per Cow	Management Income	Return on Owned Capital
	$ Per Cow	%
Under 14,000	-2	6.0
14,000 - 15,000	279	20.0
15,000 - 16,000	168	13.5
16,000 - 17,000	304	19.7
17,000 - 18,000	262	17.9
18,000 - 19,000	360	23.0
19,000 - 20,000	598	24.0
20,000 - 22,000	707	33.2
22,000 Or More	740	33.0

Although the trend was not perfectly smooth, the farms in Table 10 with higher production per cow also tended to be larger, and reported a higher percentage of net worth. It appears that high profit is associated with both more cows and more milk per cow.

Table 10. COWS AND NET WORTH POSITION, TOTAL FARM
200 Michigan Telfarmers, 1992

Pounds of Milk Sold Per Cow	Number of Farms	Number of Cows	Net Worth as % of Assets
Under 14,000	18	72	67
14,000 - 15,000	21	96	55
15,000 - 16,000	17	76	74
16,000 - 17,000	20	136	74
17,000 - 18,000	21	93	75
18,000 - 19,000	27	121	72
19,000 - 20,000	19	130	74
20,000 - 22,000	28	134	75
22,000 Or More	29	136	86

Cost control does not always mean cost minimization. Table 11 shows that as milk per cow went up, feed costs per cow tended to go up. The return above feed cost also went up.

Table 11. FEED COSTS AND RETURN ABOVE FEED COSTS, PER COW
200 Michigan Telfarmers, 1992

Pounds of Milk Sold Per Cow	Feed Disappearance	Return Above Feed Costs
		$s Per Cow
Under 14,000	1,040	936
14,000 - 15,000	983	1,239
15,000 - 16,000	1,177	1,097
16,000 - 17,000	1,202	1,340
17,000 - 18,000	1,267	1,395
18,000 - 19,000	1,327	1,493
19,000 - 20,000	1,295	1,751
20,000 - 22,000	1,344	1,885
22,000 Or More	1,420	2,098

Unlike variation in size, the labor cost per cow did not go down very much as milk per cow increased. The labor was highest for the highest milk production group, but did not correlate well with production changes.

Livestock services did go up with production, as shown in Table 12. Marketing and trucking would be expected to go up, as the charges for these items are directly related to the quantity sold. However, larger breeding and health related costs are associated with higher production levels. Again, cost control is better than cost elimination. The other items which were included in Total Livestock Services were not shown in Table 12 because they didn't change with production level.

Table 12. SELECTED LIVESTOCK COSTS PER COW
200 Michigan Telfarmers, 1992

Pounds of Milk Sold Per Cow	Semen Breeding	Health Care	Marketing Trucking	Total Livestock Services
			$s Per Cow	
Under 14,000	9.30	45.60	113	335
14,000 - 15,000	17.90	47.10	118	363
15,000 - 16,000	11.00	53.60	129	378
16,000 - 17,000	16.60	67.40	146	409
17,000 - 18,000	29.00	65.60	149	445
18,000 - 19,000	33.60	88.40	146	471
19,000 - 20,000	33.40	61.10	163	447
20,000 - 22,000	34.90	75.30	173	506
22,000 Or More	49.20	103.10	187	592

The remaining cost items you might think about were not closely-related to production per cow. The substantially higher net income levels earned by dairy farmers seemed more related to knowing where to spend their operating funds than in trying to minimize all costs. It appears that to get more milk per cow, one

needs to judiciously spend more on feed, semen, health care, and marketing services while holding other costs about average.

Appendix Tables A and B contain a full breakdown of the livestock cost categories summarized in the Telfarm system. Those costs attributed to crop production are not in Tables A and B.

APPENDIX TABLE A.
Telfarm Averages, 200 Farms, 1992, By Size

	Less than 65 Cows	65-100 Cows	100- 150 Cows	150 or more Cows
Number of farms	54	55	45	46
Net Worth	276,930	456,240	656,391	1,085,918
Net Worth as % of assets	73	75	79	73
Total Tillable Acres	306.6	436.7	596.9	835.2
Number of Cows	46.31	80.35	127.45	218.94
Milk sold per cow	16,762	17,736	19,529	19,159
FEED COSTS ($ Per Cow):				
Corn	266	285	282	276
Corn silage	152	158	155	153
Oats	10	4	4	6
Barley	10	9	8	0
Hay equivalent	422	349	315	236
Pasture	15	9	7	5
Other feed cost	421	424	509	589
Total Feed Fed	$ 1,296	$ 1,238	$ 1,280	$ 1,265
LIVESTOCK COST ($ Per Cow):				
Operator labor	205.75	116.28	76.29	43.38
Family Labor	82.07	81.34	73.22	49.37
Hired labor	101.9	148.79	195.96	256.73
Total Labor	389.72	346.41	345.47	349.48
Repairs & vehicle maint.	65.79	70.29	79.79	75.12
Fuel, oil, grease	6.51	7.08	8.45	7.82
Custom hire & lease	0	0	0	0
Depreciation	43.24	48.21	41.03	44.26
Interest on machines	10.32	10.47	10.91	13.42
Total Machinery	125.86	136.05	140.18	140.62
Conservation	0	0	0	0
Repairs	10.13	12.55	12.12	17.49
Insurance	24.83	23.03	20.83	18.21
Lease	0	0	0	0
Depreciation	42.27	37.45	40.12	57.72
Interest, buildings	16.17	17.37	16.64	29.62
Total Buildings	93.4	90.4	89.71	123.04
Semen & breeding	28.76	20.47	36.18	30.96
Vet., med., drugs	57.83	54.99	66.59	88.91
Marketing, trucking	148.75	150.91	163.74	151.95
Livestock supplies	50.05	51.09	55.28	51.78
DHIA, reg., bedding	49.86	34.38	49.59	73.18
Interest, livestock	105.91	95.88	97.05	91.94
Total Livestock	441.16	407.72	468.43	488.72
Land taxes	13.97	13.23	10.15	17.02
Interest on land	1.23	1.15	0.58	0.61
Land rent	0	0	0	0
Total Land	15.2	14.38	10.73	17.63
Utilities	65.33	61.9	56.48	56.48
Miscellaneous	20.06	18.25	14.31	14.31
Total Other	85.39	80.15	70.79	70.79

APPENDIX TABLE B.
Telfarm Averages, 1992, By Milk Per Cow

POUNDS SOLD PER COW:

	14,000-14,999	15,000-15,999	16,000-16,999	17,000-17,999	18,000-18,999	19,000-19,999	20,000-22,000	22,000 or more
No of farms	21	17	20	21	27	19	28	29
Net Worth	310,136	400,205	633,201	407,918	599,652	752,544	659,994	986,806
N.W. as % of Assets	55	74	74	75	72	74	75	86
Total Tillable Acres	385.4	397.7	598.8	464.8	609.6	616.6	589.7	620.7
Number of Cows	95.89	76.08	136.04	92.71	120.65	130.44	134.29	136.45
FEED COSTS ($ Per Cow):								
Corn	195	338	303	276	320	238	279	290
Corn silage	136	135	146	152	173	181	144	161
Oats	3	7	2	4	9	12	5	3
Barley	1	0	0	27	0	16	2	2
Hay equivalent	275	388	277	338	285	257	302	295
Pasture	9	5	8	9	11	8	4	3
Other feed cost	364	304	466	461	529	583	608	666
Total Feed Fed	$983	$1,177	$1,202	$1,267	$1,327	$1,295	$1,344	$1,420
LIVESTOCK COSTS ($ Per Cow):								
Operator labor	89.47	108.13	99.65	104.13	69.57	68.51	75.76	65.74
Family Labor	64.83	59.01	62.84	84.93	68.77	63.63	55.96	61.94
Hired labor	137.08	131.90	210.94	186.74	234.04	249.99	192.88	245.95
Total Labor	291.38	299.04	373.43	375.80	372.38	382.13	324.60	373.63
Repairs & vehicle maint.	59.16	58.27	76.85	78.02	70.89	70.42	78.45	83.06
Fuel, oil, grease	7.94	7.53	7.27	8.04	7.12	7.52	7.89	7.77
Custom hire & lease	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Depreciation	38.03	28.98	38.74	37.57	34.14	45.25	51.46	60.34
Interest on machines	11.34	2.84	9.41	12.09	9.46	18.95	12.43	13.76
Total Machinery	116.47	97.62	132.27	135.72	121.61	142.14	150.23	164.93
Conservation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Repairs	11.71	10.27	33.14	14.47	11.20	7.64	10.79	15.17
Insurance	22.19	28.71	20.29	19.33	18.56	19.54	20.72	18.75
Lease	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Depreciation	39.71	35.42	31.12	37.32	33.89	48.86	64.86	71.23
Interest, buildings	26.79	13.33	14.31	16.63	15.79	40.48	25.10	25.67
Total Buildings	100.40	87.73	98.86	87.75	79.44	116.52	121.47	130.82
Semen & breeding	17.87	10.97	16.59	28.97	33.64	33.37	34.87	49.15
Vet., med., drugs	47.14	53.64	67.41	65.60	88.40	61.11	75.27	103.05
Marketing, trucking	117.81	129.38	146.46	149.22	145.71	162.93	172.94	186.87
Livestock supplies	47.34	44.08	32.17	52.37	55.26	57.24	54.26	69.10
DHIA, reg., bedding	41.57	41.03	52.66	46.02	56.37	44.75	66.44	86.89
Interest, livestock	90.88	98.96	94.16	102.56	91.60	87.45	102.37	97.30
Total Livestock	362.61	378.06	409.45	444.74	470.98	446.85	506.15	592.36
Land taxes	18.61	8.55	11.79	11.21	12.95	19.07	16.50	16.42
Interest on land	0.74	0.92	0.60	0.89	0.83	0.68	0.49	0.97
Land rent	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Land	19.35	9.47	12.39	12.10	13.78	19.75	16.99	17.39
Utilities	57.44	61.55	54.44	62.34	58.75	62.68	59.18	69.85
Miscellaneous	13.07	19.98	15.68	15.23	18.63	12.80	19.19	13.46
Total Other	70.51	81.53	70.12	77.57	77.38	75.48	78.37	83.31