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Staff Paper

Economic Factors by Milk Sold per Cow Michigan Dairy Farms, 1999

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Economic Factors by Milk Sold Per Cow, Michigan Dairy Farms, 1999

**1999 Michigan Telfarm/MicroTel Data
Staff Paper No. 2000-41, 9 pages**

by
Sherrill B. Nott¹

Introduction

Business analysis records for 1999 were pooled from a panel 155 Michigan dairy farms. The farms were sorted by pounds of milk sold per cow into groups as follows: 10 - 15,000; 15 - 17,000; 17 - 19,000; 19 - 21,000; 21 - 23,000; and 23 - 29,000 lbs. Averages were calculated for a variety of income, expense, profitability and financial factors. Most results in this paper are reported on a per cow and per cwt. of milk sold basis.

A subset of the same panel farms were used in Staff Paper 2000-24, "1999 BUSINESS ANALYSIS SUMMARY FOR DAIRY FARMS," where additional financial documents were given. That paper reported results by 4 size groups measured in cows per farm.

Data Source

Farm types were assigned using the 1992 Census of Agriculture's Standard Industrial Classification (SIC) definitions. Basically, any farm with 50 percent or more of value of farm sales from one item becomes a farm of that type. Dairy farms have 50 percent or more of value of combined sales from milk and cull dairy animals.

This report is a summary of the financial and production records kept by dairy farmers enrolled in the Telfarm/MicroTel record program through Michigan State University Extension, or were accounting clients of AgriSolutions in Michigan, or of Farm Credit Services of Escanaba. Farm records were included if a Finan² summary was completed on 1999 data including beginning and ending balance sheets, plus income and expenses. The summary was included if cash discrepancy was less than 10% of gross cash inflow, and if the debt discrepancy was less than \$1,000. The averages are reported in the tables below; it should be recognized that considerable variability exist in the data. In Staff Paper No. 00-24, the unweighted mean of the net farm income for the 153 farms was \$124,062; the standard

¹ Professor and Farm Management Specialist; phone 517-353-4522 or nott@msu.edu Co-workers in the Telfarm/MicroTel project were R. Betz, L. Borton, R. Clark, B. Dartt, S. Harsh, M. Kelsey, G. Kole, T. Purdy, W. Schauer, G. Schwab, D. Stein, V. Varner and C. Wolf with the assistance of Michigan State University Extension Agents. AgriSolutions co-workers were Kelly Tobin, Steven Eshelman, Jan Raymond, Tiffany Cockroft, and Ann Gerke. Farm Credit Services of Wisconsin co-worker was Steve Zimmerman.

² Finan = financial analysis, one of the parts of Finpack, a financial software package from the Center for Farm Financial Management at the University of Minnesota.

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deviation of the mean was \$153,338 and the median was \$101,695. The unweighted mean of cows was 187 cows; the standard deviation of the mean was 213 cows and the median was 134 cows. The unweighted mean of pounds of milk sold per cow was 19,602 pounds; the standard deviation of the mean was 3,738 pounds and the median was 19,584 pounds.

The factors and averages in this paper were computed with Finansum. This Minnesota software allows rapid analysis of group averages with some degree of choice over how the results are presented. The farm was accepted in the average regardless of whether the farm was a proprietorship, partnership, limited liability company, or corporation.

The farms included in the averages below are not a random sample. They kept their financial records with Michigan State University's Telfarm/MicroTel accounting project, or had their accounting supervised by AgriSolutions, or Wisconsin Farm Credit Services' Escanaba office. A higher percentage of these farms use debt capital than do all farms in the state. The averages may be representative of bigger and better managed dairy farms.

This document may be found and downloaded from the following:

<http://www.msu.edu/user/nott>

Results

Table 1.		Michigan Specialized Dairy Farms, 1999					
		Size and Financial Results					
Lbs. of Milk Sold per cow:		10 - <u>15,000</u>	15 - <u>17,000</u>	17 - <u>19,000</u>	19 - <u>21,000</u>	21 - <u>23,000</u>	23 - <u>29,000</u>
Number of farms		19	15	35	23	35	28
Average size:							
Number of cows		97.7	98.9	151.0	226.1	233.7	230.5
Milk sold per cow		13,630	16,323	17,955	19,807	22,672	24,794
Number of crop acres		299	326	608	679	565	709
Average returns, cost basis:							
Net farm income (NFI)		52,230	55,326	74,356	118,450	154,615	201,444
Labor and mgt. earnings		38,912	33,487	52,198	78,523	123,266	149,213
Return on assets		4.4%	4.1%	6.7%	8.0%	12.9%	12.8%
End of year:							
Current ratio		1.28	2.78	2.00	1.45	1.50	3.62
Debt to asset ratio		36%	23%	35%	44%	37%	25%
Capital replacement margin		25,392	19,448	27,394	176,058	140,932	125,947
Operating expense ratio		66.0%	69.1%	71.9%	75.5%	69.3%	69.8%

Table 1 presents several factors about the farms in each milk production level. Each factor is the average of the farms in the group. The number of farms in each column is relatively small. Number of cows tends to go up as milk sold per cow goes up, but the trend is not smooth. Average returns on a cost basis ignores market value fluctuations of capital assets. Only the costs paid are used in the calculations.

Current ratio is calculated by dividing current debts by current assets. Lenders usually interpret a current ratio of 2.0 or greater as being an indicator of financial strength. Three of the 6 groups in Table 1 appear to be weak in terms of the current ratio.

The capital replacement margin formula is net earnings plus depreciation minus principal payments on current portions of term debts. It indicates the ability of the farm to generate funds needed to repay intermediate and long term debts, capital leases plus replace capital assets. It is an indicator of cash flow strength or weakness.

The operating expense ratio formula is total farm operating expenses minus farm interest expense divided by gross farm income. There is remarkably little difference among the columns in this factor.

All the factors in this paper are taken from the Finansum averages. For other formulas and definitions see the Finpack manuals from the University of Minnesota.

Table 2.	Michigan Specialized Dairy Farms				
	Income Items per Cow and per Cwt				
Milk sold per cow:	10 - 15,000	15 - 17,000	17 - 19,000	19 - 21,000	21 - 23,000
<u>Items per Cow:</u>					
Milk sales	2,132.16	2,535.84	2,787.61	3,154.67	3,501.08
Cull cow sales	106.33	87.08	118.94	110.41	116.46
Calf sales	10.94	18.03	11.70	10.72	17.94
Steers, replacements	10.19	97.09	56.74	41.02	14.63
Crop sales	149.85	49.94	178.38	83.24	46.67
Government payments	301.93	263.07	281.44	156.80	154.96
All other sales	407.70	326.61	416.91	262.91	228.62
Total Sales	2,817.16	3,114.59	3,570.27	3,662.97	3,925.40
<u>Items per Cwt.</u>					
Milk sales	15.64	15.54	15.53	15.93	15.44
Cull cow sales	0.78	0.53	0.66	0.56	0.51
Calf sales	0.08	0.11	0.07	0.05	0.08
Steers, replacements	0.07	0.59	0.32	0.21	0.06
Crop sales	1.10	0.31	0.99	0.42	0.21
Government payments	2.22	1.61	1.57	0.79	0.68
All other sales	2.99	2.00	2.32	1.33	1.01
Total Sales	20.67	19.08	19.88	18.49	17.31

Table 2 presents detail on the various income sources. The top portion is on a per cow basis, and the bottom is by per cwt. of milk sold. The milk sales line under “Items per Cwt.” gives the average farm milk prices received. The “Total Sales” line includes all cash income categories.

Table 3.		Michigan Specialized Dairy Farms				
		Expense Items per Cow				
Milk Sold per Cow:	10 - 15,000	15 - 17,000	17 - 19,000	19 - 21,000	21 - 23,000	23 - 29,000
Items per Cow:						
Seed	67.63	68.30	84.54	70.10	49.26	57.61
Fertilizer	172.76	121.88	171.03	119.83	97.36	112.59
Crop chemicals	33.95	49.66	71.53	54.59	37.80	72.22
Crop insurance	0.06	2.77	2.58	4.00	0.95	1.11
Drying fuel	0.00	7.11	0.39	0.00	1.07	0.50
Crop marketing	0.04	0.00	0.52	0.54	1.04	0.00
Crop misc.	6.79	7.10	12.30	5.46	8.22	16.39
Feeder livestock bought	0.00	1.35	27.71	0.84	0.00	15.62
Purchased feed	505.41	453.33	672.22	876.22	916.45	994.07
Breeding fees	10.06	20.04	11.64	27.91	30.27	36.07
Veterinary	34.77	42.97	94.05	113.47	110.88	157.64
Livestock supplies	94.93	128.44	127.62	142.88	151.58	179.65
Livestock leases	0.01	2.70	15.91	0.00	12.64	2.71
Livestock marketing	94.88	99.98	112.90	89.63	129.61	148.75
Interest	195.11	150.15	233.74	235.08	178.61	123.38
Fuel & oil	73.71	60.49	71.48	69.16	54.37	54.45
Repairs	211.42	246.37	218.41	207.16	204.21	251.02
Custom hire	43.79	52.82	105.56	69.16	91.74	81.65
Hired labor	161.62	366.26	397.93	439.78	537.72	588.89
Land rent	98.19	123.05	139.32	117.58	86.16	107.61
Machinery & bldg lease	25.99	36.75	64.66	93.80	52.73	55.70
Real estate taxes	48.77	48.04	45.47	38.11	43.06	31.27
Farm insurance	47.56	59.00	51.87	47.75	38.34	44.07
Utilities	74.32	69.40	72.64	64.28	67.06	87.70
Dues, professional fees	25.48	32.92	38.15	26.02	20.93	17.83
Miscellaneous	95.83	71.40	82.97	121.52	88.32	92.58
Total cash expenses	2,123.08	2,322.29	2,927.12	3,034.87	3,010.39	3,331.07

Table 3 presents the average cash expense items on a per cow basis in each of the milk sold per cow columns. Purchased feed, breeding fees, veterinary and hired labor go up as milk sold per cow go up. Chart 1 below, built from data in Table 3, shows these are not smooth, linear trends. For most of the other cash expense items there appears to be little relationship with milk sold per cow.

Expenses Per Cow

1999

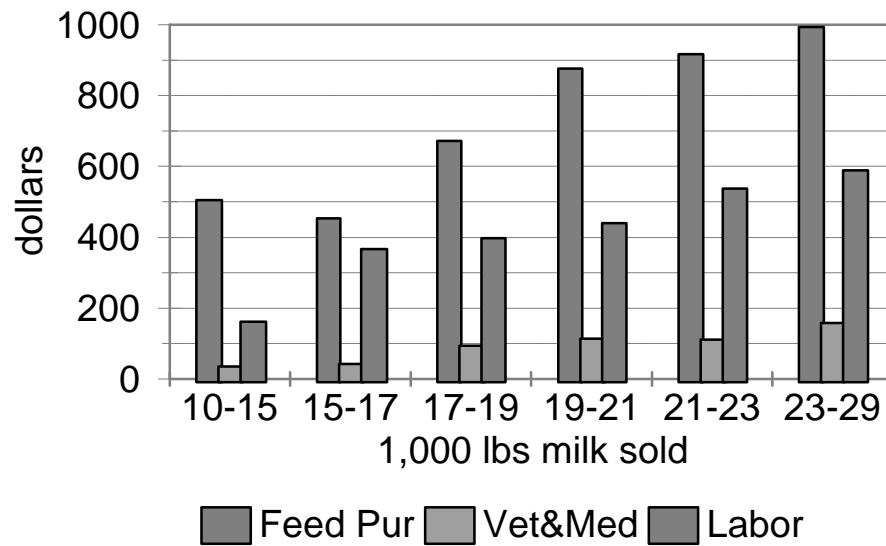


Chart 1. From Michigan Specialized Dairy Farms and Table 3

Table 4.	Michigan Specialized Dairy Farms					
	Expense Items per Cwt.					
Milk Sold per Cow:	10 - 15,000	15 - 17,000	17 - 19,000	19 - 21,000	21 - 23,000	23 - 29,000
Items per Cwt.:						
Seed	0.50	0.42	0.47	0.35	0.22	0.23
Fertilizer	1.27	0.75	0.95	0.60	0.43	0.45
Crop chemicals	0.25	0.30	0.40	0.28	0.17	0.29
Crop insurance	0.00	0.02	0.01	0.02	0.00	0.00
Drying fuel	0.00	0.04	0.00	0.00	0.00	0.00
Crop marketing	0.00	0.00	0.00	0.00	0.00	0.00
Crop misc.	0.05	0.04	0.07	0.03	0.04	0.07
Feeder livestock bought	0.00	0.01	0.15	0.00	0.00	0.06
Purchased feed	3.71	2.78	3.74	4.42	4.04	4.01
Breeding fees	0.07	0.12	0.06	0.14	0.13	0.15
Veterinary	0.26	0.26	0.52	0.57	0.49	0.64
Livestock supplies	0.70	0.79	0.71	0.72	0.67	0.72
Livestock leases	0.00	0.02	0.09	0.00	0.06	0.01
Livestock marketing	0.70	0.61	0.63	0.45	0.57	0.60
Interest	1.43	0.92	1.30	1.19	0.79	0.50
Fuel & oil	0.54	0.37	0.40	0.35	0.24	0.22
Repairs	1.55	1.51	1.22	1.05	0.90	1.01
Custom hire	0.32	0.32	0.59	0.35	0.40	0.33
Hired labor	1.19	2.24	2.22	2.22	2.37	2.38
Land rent	0.72	0.75	0.78	0.59	0.38	0.43
Machinery & bldg lease	0.19	0.23	0.36	0.47	0.23	0.22
Real estate taxes	0.36	0.29	0.25	0.19	0.19	0.13
Farm insurance	0.35	0.36	0.29	0.24	0.17	0.18
Utilities	0.55	0.43	0.40	0.32	0.30	0.35
Dues, professional fees	0.19	0.20	0.21	0.13	0.09	0.07
Miscellaneous	0.70	0.44	0.46	0.61	0.39	0.37
Total cash expenses	15.58	14.23	16.30	15.32	13.28	13.43

Table 4 presents the same cash expense items as Table 2, but calculated on a per cwt. of milk sold basis. The relationship between purchased feed and milk sold per cow is not as dramatic on a per cwt. basis as it was in Table 3 on a per cow basis.

Table 5.	Michigan Specialized Dairy Farms, 1999 Profit Measures, Per Cow and Per Cwt.						
	Milk Sold Per Cow:	10 - 15,000	15 - 17,000	17 - 19,000	19 - 21,000	21 - 23,000	23 - 29,000
	Per Cow:						
Total Sales	2,817.16	3,114.59	3,570.27	3,662.97	3,925.40	4,414.94	
Total cash expenses	2,123.08	2,322.29	2,927.12	3,034.87	3,010.39	3,331.07	
Net cash farm income	694.08	792.31	643.15	628.10	915.01	1,083.87	
Total inventory change	114.48	32.42	140.32	36.38	130.03	126.01	
Machinery depreciation	(233.41)	(304.92)	(277.97)	(266.02)	(175.90)	(243.02)	
Building depreciation	(68.02)	(83.79)	(106.80)	(46.96)	(137.43)	(100.62)	
Other capital change	27.48	123.41	93.70	172.38	(70.11)	7.70	
Net farm income	534.62	559.41	492.40	523.89	661.60	873.94	
Labor and mgt. earnings	398.28	338.59	345.68	347.29	527.45	647.34	
Capital replacement margin	259.90	196.64	181.42	778.67	603.05	546.41	
	Per Cwt.:						
Total Sales	20.67	19.08	19.88	18.49	17.31	17.81	
Total cash expenses	15.58	14.23	16.30	15.32	13.28	13.43	
Net cash farm income	5.09	4.85	3.58	3.17	4.04	4.37	
Total inventory change	0.84	0.20	0.78	0.18	0.57	0.51	
Machinery depreciation	(1.71)	(1.87)	(1.55)	(1.34)	(0.78)	(0.98)	
Building depreciation	(0.50)	(0.51)	(0.59)	(0.24)	(0.61)	(0.41)	
Other capital change	0.20	0.76	0.52	0.87	(0.31)	0.03	
Net farm income	3.92	3.43	2.74	2.64	2.92	3.52	
Labor and mgt. earnings	2.92	2.07	1.93	1.75	2.33	2.61	
Capital replacement margin	1.91	1.20	1.01	3.93	2.66	2.20	

Table 5 indicates how profit measures are calculated, from Total sales to Net farm income. The top half of the table shows the factors on a per cow basis. The bottom half shows the same factors on a per cwt. of milk sold basis. Total sales are milk plus other cash sales items. See Table 2 for a breakout of items in sales. Total sales in Table 5 are not the prices received for milk. Major components of Total inventory change are crops, feeds, and prepaid expenses.