



Beef Cattle Handbook



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Economies of Size in Cow-Calf Production

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Economies of size measure the relationship between the size of operation (number of cows) and the average cost of production or break-even price. This paper uses data from the National Cattlemen's Association-Integrated Resource Management-Standardized Performance Analysis (NCA-IRM-SPA) database to examine differences in cost of production among different cow-calf herd size groups. Additionally, differences in costs of production among profitability groups are examined to determine the factors having the greatest impact on per head profits.

Cow-Calf SPA Program

The NCA-IRM-SPA program uses a standardized methodology to measure the production and financial performance of the cow-calf enterprise. This standardized methodology was developed by the National Cattlemen's Association through producer member involvement with the National Integrated Resource Management Coordinating Committee and the Cooperative Extension Service. The focus of the performance analysis is on a few primary production, financial, and economic factors, such as the cost of weaned calf production (1,2). The standardized approach used in the NCA-IRM-SPA program facilitates comparisons among producers. Production factors in the NCA-IRM-SPA program are based on exposed female numbers. Financial and economic factors are expressed on a per cow and per cwt. weaned basis.

A distinction is made in the NCA-IRM-SPA program between financial and economic costs and returns. Financial costs are taken from the farm or ranch accrual-

adjusted financial statements (accrual adjustments to cash statements are made for changes in inventories, accounts payable and receivable, prepaid expenses, and non-cash revenue). Financial costs do not include opportunity costs for owned land, raised feed, or capital. If the financial net income is negative for a producer, or group of producers, equity is being lost by staying in the cow-calf business.

Economic costs include cash costs and opportunity costs for owned land (cash lease rate), raised feed (net market value), and capital. When economic net returns are negative and financial net income is positive, it means that owned resources are not receiving their opportunity value.

Economies of Size

Table 1 presents selected performance measures of beef cow herds in the NCA-IRM-SPA program in 1991 and 1992. Based on the information in Table 1, larger herds definitely have a competitive advantage. Herds with more than 500 cows, on average, have lower raised and purchased feed costs, lower total costs, and lower costs of production than herds with less than 500 cows. The most cost-competitive herd size group is the 500 to 999 head group. This group has the lowest financial and economic cost of production. Farms in the smallest two size groups have an average economic cost of production that is 32 percent and 24 percent above the average economic cost of production for the herds in the 500 to 999 head group. Farms with 100 to 199 cows have an average economic cost of production that is 16 percent above that of the 500 to 999 head group. Economic costs of

Table 1. Selected Performance Measures of Beef Cow Herds in the NCA-IRM-SPA Program, 1991-1992^a

	Size of Herd (Breeding Cows)						
	1 - 49 Head	50-99 Head Head	100- 199 Head	200- 299 Head	300-499 Head	500- 999	1000+ Head
Number of herds	21	28	27	30	26	27	47
Performance Measures							
Calf crop or weaning percentage	86.23	81.22	84.53	83.67	86.94	84.39	81.74
Average weaning wt. (lbs.)	487	509	528	532	510	535	485
Lbs. weaned per exposed female	429	417	449	444	440	452	394
Return on assets at cost (%)	2.77	3.86	5.72	5.45	4.62	9.04	7.87
Return on assets at market value (%)	0.85	2.70	2.89	4.39	2.70	4.88	3.29
Financial raised/ purchased feed cost (\$/cow)	138.14	136.13	146.37	102.19	113.05	60.91	65.62
Financial grazing cost (\$/cow)	106.37	97.11	81.34	76.28	73.20	85.89	61.98
Financial operating cost (\$/cow)	398.13	381.27	356.07	345.84	364.29	359.13	306.94
Financial total cost (\$/cow)	458.89	419.34	414.72	392.70	404.57	382.39	319.59
Financial net income (\$/cow)	-38.02	28.21	48.23	62.64	59.11	90.61	74.30
Financial cost of production (\$/cwt.)	99.74	82.64	81.29	77.64	80.70	68.98	74.96
Economic raised/ purchased feed cost (\$/cow)	144.27	141.49	164.02	121.49	115.22	79.34	72.28
Economic grazing cost (\$/cow)	118.34	157.00	117.55	114.17	122.13	118.53	108.97
Economic operating cost (\$/cow)	416.23	446.55	409.94	403.34	416.16	410.20	360.59
Economic total cost (\$/cow)	539.05	550.37	528.80	508.00	515.60	484.66	419.80
Economic net income (\$/cow)	-118.08	-102.82	-65.85	-52.65	-51.93	-11.66	-25.91
Economic cost of production (\$/cwt.)	120.84	113.48	106.41	103.01	106.21	91.75	101.00
Sale price of calves (\$/cwt.)	86.49	86.08	89.15	88.94	89.90	90.86	89.47

Source: James McGrann, Texas A&M University, unpublished data.

^a Based on the 206 herds from 20 states that were in the NCA-IRM-SPA Cow-Calf Data Base as of March 1994.

Table 2. Selected Performance Measures for Four Profitability Groups in the NCA-IRM-SPA Program, 1991-1992.^{a b}

Performance Measures	Quartiles			
	First	Second	Third	Fourth
Calf crop or weaning percentage	85.21	83.61	84.66	81.53
Avg. weaning weight (lbs.)	534	502	514	492
Lbs. weaned per exposed female	458	420	430	405
Return on assets at cost (%)	14.19	9.18	4.62	-4.75
Return on assets at market value (%)	7.76	4.96	3.16	-3.32
Financial raised/purchased feed cost (\$/cow)	65.35	98.92	104.20	148.76
Financial grazing cost (\$/cow)	64.06	67.00	77.61	114.44
Financial operating cost (\$/cow)	283.55	307.81	355.33	467.83
Financial total cost (\$/cow)	304.66	346.61	395.24	516.04
Financial net income (\$/cow)	186.50	95.59	29.11	-110.69
Financial cost of production (\$/cwt)	50.95	67.99	81.86	119.50
Economic raised/purchased feed cost (\$/cow)	83.87	110.67	113.50	151.63
Economic grazing cost (\$/cow)	97.80	137.30	101.30	149.70
Economic operating cost (\$/cow)	335.81	390.05	388.32	506.37
Economic total cost (\$/cow)	414.04	485.32	480.21	614.64
Economic net income (\$/cow)	77.12	-43.12	-55.86	-209.28
Economic cost of production (\$/cwt)	73.69	100.33	102.69	145.51
Sale price of calves (\$/cwt)	88.43	90.25	88.71	87.85
Distribution of Herd Sizes				
Avg. No. of cows	1655	1059	824	443
Herds with less than 100 cows	7	9	13	20
Herds with 100 to 199 cows	6	9	4	8
Herds with 200 to 499 cows	14	12	18	12
Herds with 500 or more cows	25	22	17	10

Source: James McGrann, Texas A&M University, unpublished data.

^a Based on the 206 farms from 20 states in the NCA-IRM-SPA Cow-Calf Data Base as of March 1994.

^b Financial net income per cow is used to sort the herds into quartiles.

production for the 200 to 299 head group and the 300 to 499 head group are, on average, 12 percent and 16 percent above the average economic cost of production for the 500 to 999 head group. The average economic cost of production for the largest size group, herds with more than 1000 beef cows, is 10 percent above the average economic cost of production for 500 to 999 head group. Based on this information, economies of size exist up to

the 500 to 999 head range. The fact that the largest size group has a higher cost of production than the group with 500 to 999 cows suggests that there may be some diseconomies associated with having a herd larger than 1000 cows.

As indicated in Table 1, the smallest herd size group is losing equity. The other herd size groups are not losing equity. However, all of the herd size groups are not

fully covering opportunity charges associated with owned land, raised feed, and capital. This result suggests that at least some of these resources would obtain a higher return in some alternative investment.

Profitability Groups

Size is not the only factor influencing costs of production. There is a tremendous amount of variability in costs of production between farms. Table 2 presents selected performance measures for four profitability groups using the NCA-IRM-SPA database. Financial net income per cow is used to sort the herds into the four quartiles. The first quartile has the highest financial net income. The fourth quartile has the lowest financial net income.

Herds in the first quartile have an average herd size that is more than 1200 cows larger than the average size of the herds in the fourth quartile. This suggests that there is an economic advantage associated with having a larger herd size. However, there are herds of all sizes in all four quartiles. Thus, there are some smaller herds that are doing a good job of controlling production costs and/or generating high production and gross income.

The average herd in the first quartile has a higher calf crop percentage, a higher average weaning weight, and weans more pounds per exposed female than the average herd in the other quartiles. However, the big differences between the high profitability and low profitability groups are associated with production costs. The total cost per cow on an economic basis for the high profitability group is about \$200 lower than the total cost per cow for herds in the low profitability group, or the fourth quartile. About 60 percent of this cost difference between the two profitability groups can be attributed to differences in raised and purchased feed, and grazing costs. The other 40 percent is attributable to other operating costs and fixed costs.

The economic cost of production for herds in the first quartile is about one-half of the economic cost of production for herds in the fourth quartile. Economic costs of production for the middle two quartiles are from 36 to 39 percent above the economic cost of production for the herds in the first quartile. Financial net income is positive for the first three quartiles. Economic

net income on the other hand is positive only for the first quartile. Thus, only the farms in the high profitability group are fully covering the opportunity charges associated with owned land, raised feed, and capital. All of the farms in the fourth quartile are losing equity.

Implications

The limited number of herds in the NCA-IRM-SPA database reduces the opportunities to draw strong conclusions from the data. However, initial results indicate that economies of size exist at least up to the 500 to 999 head range. The average economic cost of production for herds with 500 to 999 head is lower than that of any other herd size group. On average, herds with less than 500 cows have higher costs than herds with more than 500 cows. Herds with less than 50 cows in the NCA-IRM-SPA program are losing equity.

In addition to herd size, there are several other factors that influence the relative profitability of cow-calf enterprises. Herds in the top quartile in terms of net income tend to have higher production performance, lower feed costs, and lower fixed costs. The average herd size for the herds in the top quartile is larger than the average herd size for herds in the bottom quartile. However, there are herds of all sizes in both quartiles. Based on the information reported in this paper—for any size of operation—it is imperative to control production costs. Even with above-average production performance, high-cost producers are at a competitive disadvantage.

References

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