

# Factors Affecting Profitability of the Cow-Calf Enterprise

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## Abstract

One hundred and eighty five cow-calf enterprises were analyzed for production and financial performance measures that may affect profitability. Results of these analyses would indicate that for cow-calf enterprises in the Northern Great Plains, high levels of profit are a function of lower than average levels of investment, at least average levels of biological production (with particular attention paid to measures of weaning and pregnancy percentage), achieved with lower than average total expenses, and higher than average market values for calves produced. Neither high nor low levels of production, geographical region, size of operation, or year were factors that explained differences in profitability. The levels of profitability measured as return on assets (ROA) in the High Profit group are competitive with opportunities available in other sectors of the economy. The profit levels in the Medium and Low Profit groups are not competitive, and the long-term sustainability of the operations in these groups would be difficult without other sources of income and investment.

## Introduction

In a dynamic capitalistic economy, money, energy and people flow to where returns are the highest. The historic return on assets for businesses in our economy averages 10%.<sup>10</sup> Making money in the beef cattle business has been an elusive goal for cattlemen. With historic profit levels of 2% return on assets,<sup>4</sup> cow-calf businesses have not been friendly environments for individuals or families. During the last three decades, while other sectors of our economy have grown and flourished, fully one-half of the cow-calf producers in South Dakota and over one-half of the cow-calf producers in Nebraska have exited the business.<sup>6,7</sup>

The response of those in leadership positions in our industry and communities has largely focused on three topic areas: 1) the marketplace, especially the loss of consumer demand for beef, exports/imports, and industry concentration; 2) production increases; and 3) policy discussions related to taxes, federal land use and environmental issues. While these topic areas are certainly important, could their role in profitability and resulting community and industry stability be over-

stated? On the other hand, could the collection of actual ranch financial and production data, and the application of analytical tools common in other businesses provide insight and understanding into this complex problem? That was the direction of recent research conducted at South Dakota State University.

## Methodology

Data were collected from 185 cow-calf enterprises for the fiscal years 1991-1999 according to Standardized Performance Analysis (SPA) guidelines.<sup>5</sup> Individuals were invited to participate in the SPA process in a variety of methods. Veterinarians, county agents and educators, and Bootstraps groups hosted SPA workshops. Others contacted the university system through a variety of avenues and were invited to join scheduled workshops or were worked with on a personal basis. Participation was completely voluntary. The motivation of ranchers and farmers to participate was not recorded.

All participants were asked for the animal production and financial information necessary to complete a SPA. Production data included: 1) breeding herd inventory and date; 2) pregnancy test inventory and results; 3) female replacement rate; 4) the date the third mature cow in the herd calved; 5) calving distribution as defined by SPA; 6) calf death loss; and 7) weaning date and weights. The financial information came from a variety of sources including: 1) cost basis beginning and ending year balance sheets; 2) accrual adjusted income statements; 3) IRS Schedule F; and 4) depreciation schedules.

Farmers and ranchers from eight states cooperated in the collection of the data. In order to examine the possible effects that the type of operation or geographical location within the Northern Great Plains may have on profitability, the area was divided into three regions.

Region 1 represented an area from east of US Highway 281 in the states of North Dakota, South Dakota, Nebraska, and Kansas, and included Minnesota and Iowa. This region was chosen to represent crop/livestock-type operations. Region 2 represented an area located from US Highway 281 to the western borders of North Dakota, South Dakota, Nebraska, and Kansas

and was chosen to represent range operations. Region 3 was made up of the states of Wyoming and Montana and represented ranch operations on the eastern slope of the Rocky Mountains that may have significant amounts of federal land in their operations.

SPA production and financial measurements were used from 148 herds. ROA was measured by annual net income divided by average total assets. Net income is defined as a pre-tax and pre-family living measurement. Average total assets were calculated by averaging the beginning and ending year balance sheets. Balance sheet values were based on the financial cost of the assets or their book value. The analysis does not address the issues of deferred taxes.

In this analysis, ROA allows for the measurement and comparison of the return to invested capital, owner labor and management, and family living from one opportunity to another and accounts for the magnitude of that investment. It is the most inclusive measurement of profitability.<sup>8</sup>

The data set was divided into three profit groups. The High Profit group represented those herds with ROAs greater than one standard deviation (9.8%) above the mean ROA of 3.1% (greater than a positive plus 12.9%). The Low Profit herds were those with a ROA one standard deviation lower than the mean ROA (less than a negative 6.7%). The Medium Profit group represented those herds with a ROA between a negative 6.7% and positive 12.9%. The means for all SPA variables were compared for High Profit, Medium Profit and Low Profit herds.

## Results and Discussion

As in any business, owners and managers of cow-calf enterprises need to avoid being a low profit producer. For long-term sustainability, achieving high levels of profit is desirable. It follows that understanding the managerial behavior of the High Profit group in this sample population is important. Of the 23 SPA pro-

**Table 1.** SPA financial summary, \$ per 100 lb of weaned calf for low, medium, and high profit cow-calf enterprises.

	<u>Low, n=17</u>		<u>Medium, n=111</u>			<u>High, n=20</u>	
	Means	SEM	Means	SEM	Means	SEM	P>F
<u>Investment</u>							
Total assets	352.64 <sup>de</sup>	74.37	477.62 <sup>e</sup>	28.24	317.34 <sup>d</sup>	64.92	.037
Total liability	113.00	36.05	148.86	13.69	95.23	31.46	.232
Avg real estate	103.12 <sup>g</sup>	54.30	215.55 <sup>h</sup>	20.62	114.24 <sup>g</sup>	47.40	.039
Owner's equity	239.63	66.78	328.75	25.35	222.11	58.29	.147
<u>Expenses</u>							
Veterinary med	5.95 <sup>g</sup>	0.89	3.95 <sup>h</sup>	0.33	3.46 <sup>h</sup>	.74	.077
Depreciation	17.98 <sup>g</sup>	3.01	11.11 <sup>h</sup>	1.11	6.15 <sup>i</sup>	2.50	.013
Interest	7.16	2.24	8.54	0.85	6.77	1.95	.638
Labor & Mgt.	9.98	2.86	7.38	1.05	5.84	2.37	.538
Purchased feed	15.78	3.75	13.97	1.38	9.97	3.11	.416
Inventory Adj.	26.28 <sup>a</sup>	6.19	1.28 <sup>b</sup>	2.28	-2.41 <sup>b</sup>	5.14	.001
Total expenses	145.52 <sup>d</sup>	9.79	82.38 <sup>e</sup>	3.71	60.92 <sup>f</sup>	8.54	.001
<u>Revenue</u>							
Calf revenue	83.18 <sup>gh</sup>	7.89	76.28 <sup>g</sup>	3.04	92.96 <sup>h</sup>	6.98	.083
Non-calf revenue	5.75	5.46	14.86	2.07	19.50	4.77	.161
Total revenue	88.92 <sup>d</sup>	8.90	91.14 <sup>d</sup>	3.38	112.45 <sup>e</sup>	7.77	.038
<u>Profit</u>							
Breakeven	136.43 <sup>d</sup>	9.28	66.05 <sup>e</sup>	3.52	40.63 <sup>f</sup>	8.10	.001
Net income	-56.63 <sup>a</sup>	6.84	8.78 <sup>b</sup>	2.60	51.53 <sup>c</sup>	5.97	.001

<sup>abc</sup> Means within the same row with different superscripts differ (P < 0.01).

<sup>def</sup> Means within the same row with different superscripts differ (P < 0.05).

<sup>ghi</sup> Means within the same row with different superscripts differ (P < 0.10).

**Table 2.** SPA financial summary, owner's equity and ROA for low, medium, and high profit cow-calf enterprises (%)

	<u>Low, n=17</u>		<u>Medium, n=111</u>		<u>High, n=20</u>		P>F
	Means	SEM	Means	SEM	Means	SEM	
Owner's equity	67.95	2.24	68.83	.85	69.99	1.96	.741
ROA	-15.55 <sup>a</sup>	1.28	2.88 <sup>b</sup>	0.49	18.16 <sup>c</sup>	1.12	.001

<sup>abc</sup> Means within the same row with different superscripts differ ( $P < 0.01$ ).

duction measurements used to describe the cow-calf enterprise (Table 3) that were compared for Low, Medium and High Profit, the only measurement for which High Profit enterprises were higher ( $P < 0.10$ ) than Medium and Low Profit enterprises was weaning percentage. The weaning percentages were 90.15, 86.55 and 83.40 for High, Medium and Low Profit, respectively. High and Medium Profit enterprises did have higher calving percentages and weaned more pounds per cow exposed than did Low Profit ( $P < 0.10$ ). Medium Profit weaned heavier calves and heavier male calves than did Low Profit ( $P < 0.10$ ). There were no significant differences between High and Medium Profit operations for measures of size of operation, weaning weight, pregnancy percentage, calving percentage, female replacement rate, the measures of calving distribution, pounds of weaned calf per cow exposed, or stocking rate.

The same was not the case for the comparisons of SPA financial measurements. On a per 100 lb of weaned calf basis (Table 1), High Profit enterprises had fewer total dollars invested than did Medium Profit ( $P < 0.05$ ). They also had lower depreciation expenses ( $P < 0.10$ ) and lower total expenditures ( $P < 0.05$ ) than both Medium and Low Profit enterprises. High Profit enterprises had higher revenue ( $P < 0.05$ ), lower breakevens ( $P < 0.05$ ), and higher net income and ROA ( $P < 0.01$ ) (Table 2) than Medium and Low profit enterprises.

High levels of profit can arise from many combinations of production and financial performance. For example, differences in ROA can be based on different levels of both financial investment and net income. Net income is a function of quantity sold, dollars received and total expenditures. Therefore, differences in ROA between cow-calf enterprises could be explained by any combination of assets invested, quantity produced, market value of that production, or the cost of that production. However, in this sample population, High Profit enterprises invested fewer dollars, had higher total revenue, lower total expenditures, and higher levels of net income than Medium Profit enterprises.

It is important to note that High Profit enterprises were able to produce the same number of pounds of calf per exposed female at a lower breakeven ( $P < 0.01$ ), and at lower level of investment ( $P < 0.01$ ) than Medium or

Low Profit enterprises. This is contrary to reports that highly profitable cow-calf enterprises had higher production levels<sup>2,9</sup> and annual expenses at least as high as average profit herds.<sup>1</sup> The differences noted in these reports were numerical, not statistical.

Due to economies of scale, there has been speculation that larger cow-calf enterprises are more profitable than smaller operations.<sup>4</sup> In this sample population, no measurement of size of operation surfaced as a factor affecting profitability in regression analysis and there were no significant differences in size of operation between High, Medium and Low Profit groups. While small operations may not be able to generate high enough levels of profit to fully cover family living and required returns to capital, they were just as efficient at converting dollars of investment into net income as large operations. This may be due to synergistic effects with other enterprises not measured by SPA. For example, the use of crop residues or the ability to depreciate equipment over multiple enterprises may compensate small operations for the loss of economies of scale when compared to larger operations.

There has also been speculation that regional differences may account for differences in profitability. While production systems in the three designated regions within this analysis vary, region was not a factor affecting profitability. This would indicate that the opportunity for profit was not determined by geographical region, but management's response to opportunities and challenges within regions.

While measurements on a per cow and per acre basis are useful and of interest, the most sensitive unit of measure in these analyses was on a hundred pounds of weaned calf basis. This is important because it is not only the unit of measure for marketing, but also the most inclusive measurement of productivity and efficiency.<sup>3</sup> The 18.16% ROAs for High Profit herds (Table 2) in this sample population are very competitive with those of other businesses and investment opportunities in our economy. To put this in perspective, to generate \$35,000.00 of family living and pay off all debt in 10 years, the average cow-calf producer in the High Profit group would need a herd of approximately 200 beginning year breeding females. This size herd presents a

**Table 3.** SPA production summary for low, medium, and high profit cow-calf enterprises.

	<u>Low, n=17</u>		<u>Medium, n=111</u>			<u>High, n=20</u>		
	Means	SEM	Means	SEM	Means	SEM	P>F	
<u>Cow-calf enterprise summary</u>								
Total adjusted exposed females	490	182	535	69	486	159	.942	
Beginning fiscal yr breeding females	469	176	519	67	474	154	.940	
Total acres	10646	5844	12933	2179	11708	4940	.921	
Acres/exposed female	21.74	17.29	24.21	7.41	24.21	14.82	.468	
<u>Reproduction performance measures based on exposed females</u>								
Avg beginning								
Gregorian calving date	70	6	58	2	58	5	.952	
Days in breeding season	79	13	89	5	90	11	.749	
Pregnancy %	90.88	1.17	93.03	.46	94.13	.99	.104	
Pregnancy loss %	3.17	2.50	3.11	.99	3.02	2.12	.999	
Calving %	88 <sup>a</sup>	1.80	92 <sup>b</sup>	.68	94 <sup>b</sup>	1.57	.061	
Calf death loss %	2.98	.96	3.42	.36	2.37	.84	.501	
Calf crop or weaning %	83 <sup>a</sup>	1.91	87 <sup>a</sup>	.73	90 <sup>b</sup>	1.67	.029	
Female replacement rate, %	15.99	5.04	20.28	1.90	19.32	4.36	.725	
<u>Calving performance measures based on calves born</u>								
Calf death loss rate, %	5.42	1.09	5.05	.42	3.69	.10	.379	
% calves born d 1 - 21	52.22	4.32	57.06	1.70	58.96	3.78	.481	
% calves born d 1 – 42	81.84	1.99	84.61	1.34	86.51	2.98	.353	
% calves born d 1 – 63	95.45	1.99	95.92	.90	95.45	1.99	.626	
% calves born d 63+	4.79	2.43	4.09	.96	4.43	2.13	.960	
<u>Production performance measures, (lb)</u>								
Avg age at weaning, d	200	7	199	3	198	6	.963	
Avg weaning weight, male	499 <sup>a</sup>	16	536 <sup>b</sup>	6	513 <sup>ab</sup>	15	.056	
Avg weaning weight heifer	487	15	517	6	504	13	.133	
Avg weaning weight calf	493 <sup>a</sup>	15	525 <sup>b</sup>	6	507 <sup>ab</sup>	13	.082	
Lb weaned/exposed female	413 <sup>a</sup>	18	455 <sup>b</sup>	7	455 <sup>ab</sup>	15	.078	
Lb weaned/ acre used by the cow-calf enterprise	96.8	24.2	101.20	8.8	83.60	22	.727	

<sup>a, b</sup> Means within the same row with different superscripts differ (P < 0.10).

<sup>a, b</sup> Means within the same row with different superscripts differ (P < 0.10).



very competitive opportunity for family farmers and ranchers from both an investment as well as labor perspective.

### Conclusions

Results of these analyses would indicate that for cow-calf enterprises in the Northern Great Plains, high levels of profit are a function of lower-than-average levels of investment, at least average levels of biological production (with particular attention paid to measures of weaning and pregnancy percentage) achieved with lower than average total expenses, and higher than average market values for calves produced. Neither high nor low levels of production, geographical region, size of operation, or year were factors that explained differences in profitability.

Profit is most certainly a complex set of relationships between levels of investment and production, annual expenses and the marketplace. (Figure 1)

There has been a great deal of interest within the cattle industry in establishing benchmarks for profitability. Based on these analyses, it would not be prudent to offer production benchmarks for profitability. There were few important differences in production traits. Differences in financial performance do exist but can be misleading. For example, Low Profit and High Profit enterprises in this sample population had similar levels of investment and equity but very different levels of expenses and total revenue. As a result making blanket recommendations is difficult.

Both as individuals and collectively, farmers and ranchers involved in the cattle industry have long sought

solutions to the profitability problem of beef cattle production in three main areas: the general economy, production, and policy. The results of these analyses strongly indicate that cattlemen should focus their attention on increasing profitability by making management decisions under their control, specifically as it concerns the areas of level of investment, cost control, and marketing their livestock.

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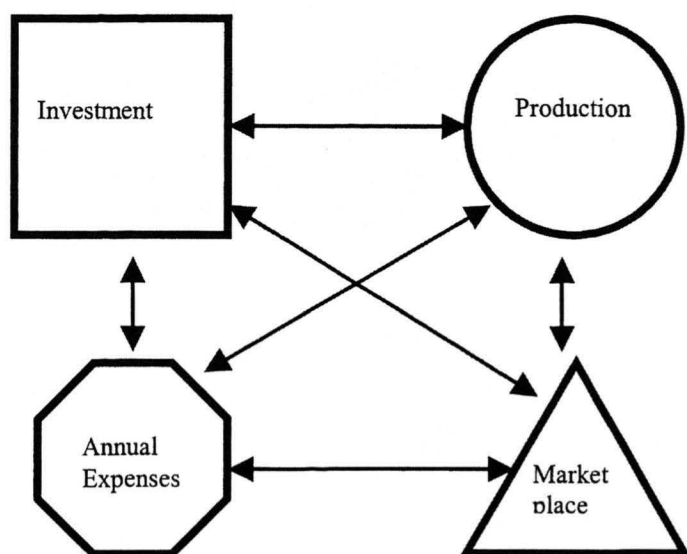


Figure 1.

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