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South Dakota Retained Ownership Demonstration

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Summary

Four hundred nineteen steer calves representing 57 cow-calf producers were consigned to a custom feedlot in mid-October. Cattle were fed in one of three pens. One pen of calves was fed a starter program for 20 days followed by a moderate roughage growing diet for 84 days before they were switched to a high energy finishing diet (TWO). The other two pens were fed a starter program for 20 days followed by a moderate roughage growing diet for 14 days before they were switched to a high energy finishing diet. Cattle were sorted into one of these two pens on the basis of whether they had been exposed to feed (AFED, either weaned or creep fed) prior to feedlot arrival or not exposed to feed (ANFED). The TWO calves weighed 500 lb initially, gained 2.80 lb per head daily, and averaged 1047 lb at slaughter after an average of 196 days on feed. Average cost of gain and profitability were $58.27 per cwt and -$28.74 per head, respectively. The AFED and ANFED calves weighed 539 and 554 lb initially, gained 3.04 and 3.08 lb per head daily, and averaged 1116 and 1136 lb at slaughter after an average of 190 and 189 days on feed, respectively. Average cost of gain and profitability were $55.40 and $56.32 per cwt and $23.57 and $33.20 per head, respectively. When data from years 1 and 2 were combined, average daily gain, dressing percentage, quality grade, and cost of gain were related to profitability and accounted for 79.6% of the variation in profitability.

(Key Words: Retained Ownership, Feedlot Performance, Feedlot Profitability.)

Introduction

Retained ownership of feeder calves has been shown to consistently improve profitability of cow-calf operations through either an increase in net returns per cow or through minimizing losses in some years. Average profits in 1990-91 for cattle enrolled in the South Dakota Retained Ownership Demonstration were $38.75 and $16.69 per head for an accelerated finishing and two-phase growing and finishing programs, respectively. The range in profitability for all 69 groups of 5 steers was from -$56.57 to $131.36. An understanding of factors influencing the profitability of retained ownership is essential in order to successfully use retained ownership as a market alternative.

The overall objective of this multi-year program is to evaluate retained ownership as a marketing alternative for cow-calf producers. This report summarizes data from the second year of the project.

Materials and Methods

Fifty-seven cow-calf producers consigned 84 groups of five steer calves to a custom feedlot[7] in mid-October of 1991. One hundred sixty calves arrived at the lot the evening prior to processing and were

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allowed access to water overnight. The remaining calves were processed upon arrival.

Processing procedures included weighing, measuring hip height and determining initial fat thickness with an ultrasound instrument. All calves were treated with Ivomec[8] to control parasites and implanted with Synovex-S[9]. They received 7-way clostridial bacterin and were vaccinated for IBR, BVD, PI_3, BRSV and Hemophilus somnus. Appropriate boosters were given on day 21 in the lot.

Following processing, calves were separated into one of three pens. Cattle in one pen were fed according to a traditional two phase growing and finishing program (TWO). Cattle in the other two pens were fed according to an accelerated finishing program. Cattle were sorted into one of these two pens on the basis of whether they had been exposed to feed (AFED, either weaned or creep fed) prior to feedlot arrival or not exposed to feed (ANFED).

All three groups were fed long stem alfalfa-grass hay and a commercial receiving feed[10]. Over a several day period as cattle became accustomed to eating at the bunk, a growing ration (Table 1) gradually replaced the hay for the TWO calves, while a winter finishing ration (Table 1) gradually replaced the hay for the AFED and ANFED calves. The commercial receiving feed was increased until the calves were eating about 3% of their body weight (about 16 lb per head daily). At this point, an additional growing ration or winter finishing ration gradually replaced the receiving feed for the TWO and accelerated calves, respectively.

On day 12 in the feedlot, a storm system moved through. Over an inch of rain followed by freezing rain and snow completely soaked the calves and the feedlot. Cattle in the AFED and ANFED pens went off feed during the storm. In order to minimize digestive upsets and reduce stress on the cattle, a growing ration was fed in place of the winter finisher. Once intakes and the weather was stable, cattle were stepped up through a series of intermediate rations until the cattle were back to the winter finisher.

Fifty-five calves were fed the growing diet until day 104. Then, they were stepped up to the final finishing diet (Table 1). Calves in the accelerated pens were fed the winter finishing until mid-February. Then they were switched to the final finisher until slaughter.

Since all cattle were fed in one of three pens, individual feed bills were calculated from performance data according to equations published by the National Research Council. Cattle were weighed approximately every 6 weeks. Ration energy density was calculated for each feeding program from the average performance for each pen. An estimate of individual intake was calculated for each calf using calf weight, daily gain and ration energy density.

Feed, yardage, and veterinary bills were financed through a commercial bank[11]. Death loss was shared by all participants. Producers were sent periodic progress reports and copies of their feed bills. Each group of five cattle were slaughtered when three steers from the group appeared to reach .4 inch of fat over the 12th rib.

Results and Discussion

A wide variety of cattle types were represented in the program. Straightbreds or crosses of the following breeds were consigned: Amerifax, Angus, Beefalo, Charolais, Chianina, Continental, Galloway, Gelbvieh, Hereford, Holstein, Jersey, Limousin, Maine Anjou, Murray Grey, Red Angus, Rx3[12], Salers, Shorthorn, Simmental and Tarentaise.

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[8]Product of MSDAGVET, Rahway, NJ.
[9]Product of Syntex Animal Health, West Des Moines, IA.
[10]Pre-Con, product of Purina Mills, Inc., St. Louis, MO.
[11]Tri-County State Bank, Kimball, SD.
[12]A composite breed of Red Angus, Hereford and Red Holstein.

Table 1. Composition of diets fed to steers

Item	Diet		
	Grower	Winter finisher	Final finisher
Ingredient[a]			
Mixed silage[b]	54.87	32.32	26.37
Alfalfa hay	12.00	-	-
Cracked corn	29.67	63.08	68.78
Supplement[c]	3.28	4.41	4.66
Mineral	.19	.19	.19
Nutrient[d]			
Crude protein, %	12.99	12.30	12.40
NE_m, Mcal/cwt	80.91	93.57	94.59
NE_g, Mcal/cwt	49.00	61.23	62.23
Calcium, %	.81	.56	.55
Phosphorus, %	.34	.37	.37
Vitamin A, IU/lb	4613	3323	3246
Rumensin, g/ton	20	22.5	22.7

[a] Percentage, as fed.
[b] Approximate as fed composition: corn 33.3%, cane 33.3%, and alfalfa 33.3%.
[c] Sup-R-Lix, Purina Mills, Inc.
[d] Dry matter basis.

Initial weight, hip height and fat thickness are displayed in Table 2. Generally, cattle placed in the accelerated program pens were taller ($P<.0001$) at the hip and heavier ($P<.001$) than calves placed in the two-phase program. There were a few smaller framed, lighter calves in all pens. Steers in the ANFED pen were heavier ($P<.05$) and carried slightly more condition ($P<.0001$) than steers in the AFED pen.

Feedlot performance information is shown in Table 3. Cattle were weighed full the day prior to slaughter. Slaughter weight for each steer was computed by applying a 4% pencil shrink to this full weight. Slaughter weight was greater ($P<.0001$) for steers on the accelerated program as compared with steers on the two-phase program (1116 and 1136 vs 1047 lb, respectively). Average daily gain was also greater ($P<.0001$) for accelerated steers than for two-phase steers (3.04 and 3.08 vs 2.80 lb per head daily). Accelerated steers were fed fewer days ($P<.01$) than two-phase steers (190 and 189 vs 196 days for AFED, ANFED vs TWO, respectively).

Actual average dry matter intake was 19.68 and 20.06 lb per head daily for the AFED and ANFED steers, respectively. Two-phase steers consumed an average of 20.43 lb dry matter per head daily. Feed to gain ratio was 6.47, 6.51 and 7.29 lb dry matter per pound gain for the AFED, ANFED and TWO steers, respectively.

Table 4 shows carcass data collected for the steers. Carcasses of two-phase cattle were lighter ($P<.0001$) than carcasses of accelerated calves. Dressing percentage ($P<.001$), rib eye area ($P<.10$) and marbling scores ($P<.01$) were lower for two-phase cattle than for accelerated calves. Accelerated calves that were previously exposed to feed had lighter ($P<.01$) carcasses and lower dressing percentages ($P<.001$), backfat thickness ($P<.0001$), and yield grades

Table 2. Initial weight, hip height, and fat thickness of program steers

	Weight, lb	Height, in.	Fat thickness, in.
Accelerated, fed			
Average	539	44.00	.042
Range	346-720	39.50-49.00	.00-.12
Standard deviation	68	1.96	.02
Range (5 head)	391-654	40.40-48.00	.012-.076
Accelerated, not fed			
Average	554	44.24	.057
Range	370-786	39.50-50.00	.02-.16
Standard deviation	76	1.92	.03
Range (5 head)	450-745	41.65-48.20	.032-.12
Two phase			
Average	500	41.79	.052
Range	382-576	38.50-45.00	.04-.12
Standard deviation	37	1.63	.02
Range (5 head)	452-532	39.15-43.85	.04-.072

Table 3. Feedlot performance of program steers

	Slaughter wt, lb	ADG, lb	Days fed
Accelerated, fed			
Average	1116	3.04	190
Range	804-1398	1.88-4.00	166-215
Standard deviation	106	.35	15
Range (5 head)	945-1334	2.66-3.40	166-215
Accelerated, not fed			
Average	1136	3.08	189
Range	849-1386	1.54-4.06	166-215
Standard deviation	107	.39	18
Range (5 head)	978-1284	2.60-3.47	166-215
Two phase			
Average	1047	2.80	196
Range	918-1179	2.25-3.48	189-215
Standard deviation	64	.29	12
Range (5 head)	996-1122	2.50-3.10	189-215

Table 4. Carcass data for steers

Pen	Hot carcass wt, lb	Dressing percent	Fat thickness, in.	Rib eye area, $in.^2$	Kidney, heart and pelvic fat, %	Calculated yield grade, units	Marbling score[a], units	Percent choice
Accelerated, fed								
Average	710	63.55	.41	12.33	2.32	2.75	4.67	36.4
Range	464-916	57.68-70.26	.10-.80	8.7-18.6	1.00-3.50	.49-4.16	3.00-6.20	
Standard deviation	78	2.13	.14	1.84	.55	.67	.51	
Range (5 head)	572-847	60.46-68.08	.26-.61	9.66-15.80	1.40-2.90	1.60-3.49	3.96-5.48	0-100
Accelerated, not fed								
Average	731	64.29	.49	12.32	2.47	3.06	4.73	40.1
Range	553-928	60.00-68.81	.10-1.10	8.80-16.00	1.00-3.50	1.48-5.06	3.00-7.00	
Standard deviation	74	1.73	.17	1.45	.55	.67	.56	
Range (5 head)	608-851	62.06-66.25	.30-.74	10.00-14.45	1.50-3.10	2.08-3.81	4.16-5.44	0-100
Two phase program								
Average	659	62.93	.46	11.88	2.57	2.87	4.49	18.5
Range	583-747	59.59-66.16	.20-.80	9.6-15.4	2.00-3.50	1.46-4.32	3.50-5.50	
Standard deviation	40	1.47	.13	1.20	.41	.64	.42	
Range (5 head)	616-702	61.17-64.36	.35-.55	11.06-12.88	2.10-2.90	2.31-3.26	4.08-4.84	0-60

[a] 3.00 = Traces^{O}, 4.00 = Slight^{O}, 5.00 = Small^{O}, 6.00 = Modest^{O}, 7.00 = Moderate^{O} and 8.00 = Slightly abundant^{O}.

(P<.0001) than nonfeed exposed, accelerated calves. Percentage choice carcasses for the AFED, ANFED and TWO calves were 36.4, 40.1 and 18.5, respectively.

Although there appears to be differences in cattle performance and carcass characteristics between the three pens of cattle, these differences may not be due to the different feeding programs. Cattle were not randomly assigned to each pen. Therefore, initial weight, hip height, genetic make-up and other factors of the pens were different.

Table 5 shows the feeding period costs for the cattle. Feed and yardage expenses were greater for the two-phase cattle due to additional time on feed. Marketing expenses included insurance, check-off and weighing charges. Fifteen steers died during the project. Four of these deaths were from Hemophilus somnus, two were from bloat and nine were due to respiratory infections of unknown origin. Seven of the deaths were from each accelerated pen and one from the two-phase pen. However, all participants shared death loss equally.

Feed cost of gain and total cost of gain are expressed on a pay weight to pay weight basis and were similar for both accelerated pens of cattle. Feed cost of gain was slightly higher for the two-phase calves. Initial pay weight was assumed to be 4% greater than initial weight obtained at the feedyard. The weight obtained the day prior to slaughter less the 4% pencil shrink was assumed to equal finished pay weight. Break-even sale price was $75.62, $75.78, and $78.15 per cwt for the AFED, ANFED and TWO calves, respectively.

Table 6 shows the initial value, sale value and profitability of the program steers. Initial price was computed by using numerous sale barn reports for the last 3 weeks in October 1991 and regressing price on pay weight (Figure 1). The equation predicting price was Price ($/cwt) = 163.3314 - .1806 x weight (lb) + .000107 x weight (lb)^2. One thousand three hundred fifty-four observations were used in the regression. The coefficient of determination (R^2) was .7097. No attempt was made to adjust the initial prices for breed type, frame size, initial condition or location.

All cattle were sold on a grade and yield basis. Average carcass price was slightly higher for the accelerated calves than for the two-phase calves because a higher proportion of the accelerated calves graded choice. The base choice carcass price and the select discount were $125 and $2, $126 and $2, $122 and $3 and $125 and $6 for cattle slaughtered after 166 (March 31), 180 (April 14), 189 (April 23) and 215 days (May 19) on feed.

Profits excluding calf interest and trucking to the lot were $23.57, $33.20, and -$28.74 per head, respectively, for the AFED, ANFED and TWO calves. Interest on the calf should be accounted for when evaluating retained ownership profitability. If opportunity interest on the calf was 7%, interest charges and profitability would have been $19.52 and $4.03, $19.80 and $13.36, and $19.21 and -$47.96 per head for the AFED, ANFED and TWO calves, respectively. Another way to examine profitability and calf interest is to calculate an annual return on investing the calf in a retained ownership program. Annual return on investment (initial calf value) was 8.31, 11.67 and -10.61% for the AFED, ANFED and TWO calves, respectively.

The range in cattle profitability between groups of five head within each feeding program was tremendous. There were 74 groups of cattle in the accelerated program. Profitability of these groups ranged from -$53.01 to $98.55 per head. Sixty-two of the groups made a profit. Only 12 groups lost money. Only one group of calves out of a total of eleven made a profit in the two-phase program. Profitability ranged from -$63.72 to $2.94 per head.

Another way to express retained ownership profitability is to use slaughter value and feedlot costs to back calculate the value of the calves in the fall when they were placed into the feedlot. Accelerated program steers were worth an average of $878.26 at slaughter. Feedlot costs averaged $300.34. Therefore, the average accelerated program calf was worth $577.92 in the fall. Average pay weight in the fall was 568 lb. Thus, accelerated calves were worth $101.75 per cwt in the fall. This represents a premium of about $5.88 per cwt compared with the average market price obtained

Table 5. Feeding period costs[a]

Item	Accelerated, fed	Accelerated, not fed	Two phase
Feed	220.92	224.51	229.69
Yardage	28.50	28.35	29.40
Veterinary	11.96	12.57	10.87
Interest[b]	6.28	6.37	6.35
Trucking[c]	7.73	8.08	6.97
Marketing	1.58	1.59	1.59
Death loss	21.42	21.42	21.42
Total	298.39	302.89	306.29
Feed cost of gain[d], $/cwt	39.88	40.25	43.61
Total cost of gain[d], $/cwt	55.40	56.31	58.27
Break-even sale price, $/cwt	75.62	75.78	78.15

[a] Dollars per head.
[b] Interest on feed, yardage and veterinary expenses only.
[c] Trucking to packing plant only.
[d] Pay weight basis.

Table 6. Profitability of retained ownership steers

	Feeding program		
Item	Accelerated, fed	Accelerated, not fed	Two phase
Initial pay weight, lb	561	577	520
Price, $/cwt	96.23	95.41	98.51
Initial value, $	539.85	550.52	512.25
Hot carcass wt, lb	710	731	659
Price, $/cwt	122.08	122.24	119.70
Sale value, $	866.77	893.57	788.82
Profit, $/head[a]	23.57	33.20	-28.74
Annual return on investment, %	8.31	11.67	-10.61

[a] Excludes calf interest and trucking to the feedlot.

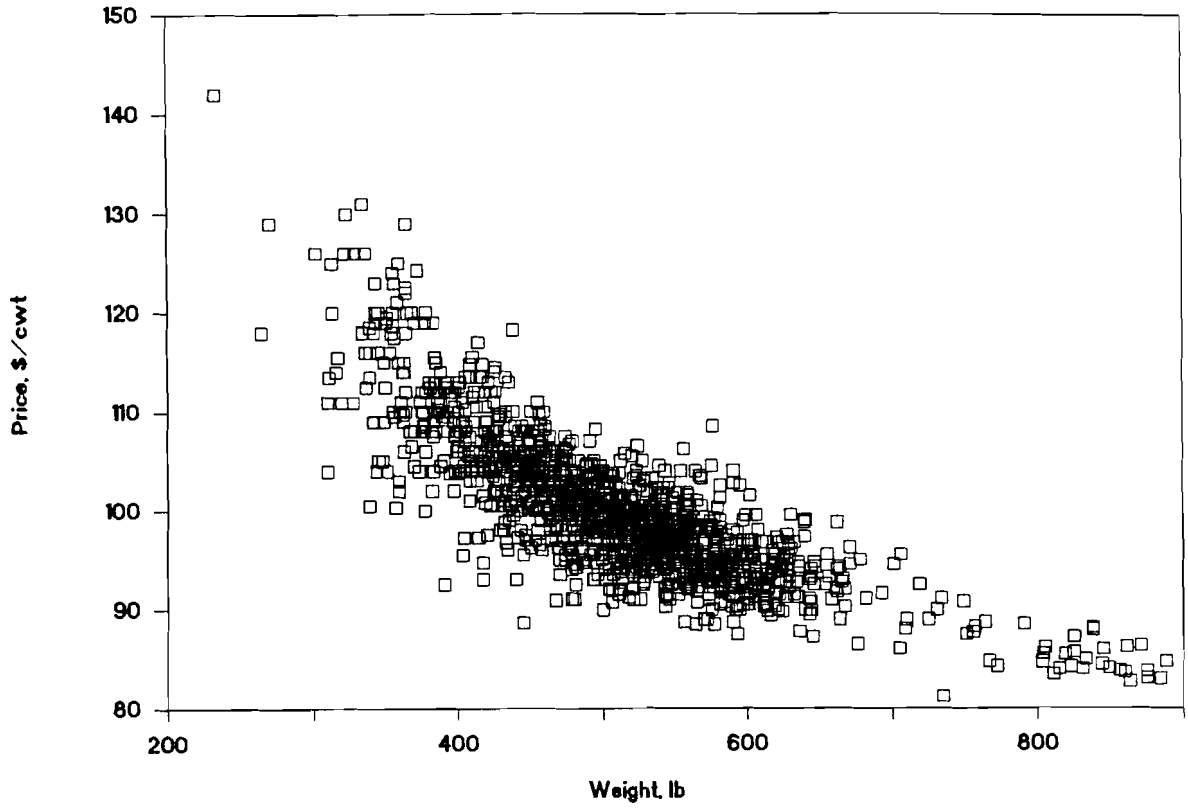

Figure 1. Relationship between price and pay weight.

from Figure 1. Two-phase program steers were worth $788.82 at slaughter, cost $306.29 to feed and had a pay weight of 520 lb in the fall. Thus, they were worth only $92.79 per cwt in the fall. This represents about a $5.72 per cwt discount in the fall compared with the price obtained from Figure 1. In other words on the average, accelerated producers made an additional $5.88 per cwt on their calves by feeding them out. However, two-phase producers lost $5.72 per cwt on their calves by feeding them.

The range in fall calf values over both feeding programs was from a discount of $11.95 per cwt for one group of five steers up to a premium of $21.99 per cwt for another group of five. Premiums of this magnitude are never applied in the feeder calf market. The only way for cow-calf producers to be fully rewarded for superior genetics is to retain ownership of the calf crop. However, these data also show that there are cattle that should not be fed directly to finish at a custom feedlot. Perhaps these cattle are best suited for high roughage wintering programs followed by grazing in the summer.

Data from year 2 of the project were combined with data collected in 1990-91. Forward selection regression procedures were used to study factors related to profitability. Table 7 summarizes the regression statistics for the model. Average daily gain was the first variable selected into the model predicting profit. It explained 29.01% of the variation in profit. For every .1 lb increase in average daily gain, profit was improved by $6.43 per head. Dressing percentage explained an additional 30.04% of the variation in profit and was the second variable to be selected into the model. A full percentage unit increase in dressing percentage corresponded to a $14.62 increase in profitability. Quality grade was selected third into the model and accounted for an additional 16.14% of the variation. If a carcass graded choice rather than select or lower, profit was improved by $39.94. Total cost of gain came into the model fourth and explained an additional 4.4% of the variation in profit. For each $1.00 per cwt increase in cost of gain, profit was reduced by $2.63 per head. These four variables accounted for 79.6% of the variation in profit and no other variable accounted for more than 4% of the remaining variation in profit. Table 8 further illustrates how gain, dressing percentage, quality grade, and cost of gain impact profit.

Table 7. Summary of regression statistics

Variable	Parameter estimate	Standard error	Probability	Partial R^2
Intercept	-972.40	31.79	.0001	
Average daily gain	64.31	2.57	.0001	.2901
Dressing percentage	14.62	.45	.0001	.3004
Quality grade[a]	39.94	1.75	.0001	.1614
Cost of gain[b]	-2.63	.21	.0001	.0440

[a] 0 = select or lower, 1 = choice or higher.
[b] Total costs excluding calf interest, pay to pay basis.

Table 8. Value of select variables for low, middle and high profit groups

	Profit group		
Variable	Low 1/3	Mid 1/3	High 1/3
Profit, $/head	-29.36	25.87	81.48
Average daily gain, lb	2.73	3.01	3.15
Dressing percent	62.95	63.79	64.93
Percent choice	14.92	38.71	69.35
Cost of gain	56.46	54.09	52.75

The importance of dressing percentage and quality grade is due to the fact that the cattle were sold on a grade and yield basis. Average daily gain is important as it relates to market timing and cost of gain. In year 1, the slaughter market was stronger at the earlier marketing dates than the later. In year 2, the choice carcass market remained relatively stable over all marketing dates. In both years, the choice-select price spread increased throughout the spring and was higher for the later market dates.

Regression procedures were also used to try to predict profitability from the initial data that were available each fall. Variables examined included initial weight, hip height, fat thickness and age; sire breed and dam breed; and whether the calves were creep fed, vaccinated or weaned prior to feedlot arrival. Only 11.5% of the variation in profitability could be explained using this information. In other words, we cannot use these variables to predict in the fall how profitable a retained ownership program will likely be. Factors such as market conditions, feedlot performance, and carcass merit are much more important in determining profitability.

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