Impact of Categorizing Market Value and Gross Return of Calves Enrolled in the Arkansas Steer Feedout Program on Performance and Carcass Characteristics

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Story in Brief

The impact of categorizing market value into above (A) and below (B) average initial value upon feedyard arrival and gross return from feeding on calf performance and carcass characteristics was determined using results from the 2001, 2002, and 2003 Arkansas Steer Feedout program. The first letter (A or B) when presented in sets of two is the initial value category and the second is the gross return category The average initial value was $479, $490, and $584/head for the three years, respectively, and the average gross return above feedyard expenses was $491, $592, and $681/head for the 3 years, respectively. The percentage of cattle categorized by initial value and gross return and grouped A or B were 33.1, 15.8, 17.4, and 33.7% for AA, AB, BA, and BB groups, respectively. Above average initial value cattle were 118 lb heavier upon arrival ($P < 0.001$), but initial value per hundred-weight did not differ ($P = 0.53$). Cattle with above average initial value were characterized as being heavier muscled ($P < 0.001$), larger framed ($P < 0.001$) and containing a higher percentage of black coat colors ($P = 0.03$) and less than 25% Brahman influence ($P = 0.04$). The group also had heavier carcass weights ($P < 0.001$) and a higher percentage grade USDA choice ($P = 0.03$). Those calves with a below average initial value were more profitable ($P < 0.001$) than the calves with above average initial value, $88.27 and $26.17/head net return, respectively. Calves with above average initial value as a whole were less profitable than below average initial value calves, likely as a result of over-valuing calves in the above average initial value group.

Introduction

Cattle producers in Arkansas typically market calves through local auction barns at weaning. Marketing cattle at this point in the production system results in a loss of vital production information that could be used to determine how the calf crop meets the demands of the consumer. Herd size and cash flow become a limiting factor for many producers to retain ownership through the feedlot phase. The University of Arkansas Steer Feedout Program is an educational program that provides cattle producers the opportunity to acquire post-weaning growth performance and carcass information. The program is not designed to serve as a marketing alternative, but provides an opportunity to collect production information that can be used to make breeding and selection decisions. The program also provides insight into whether or not the price received locally is justified based upon the carcass value and feedyard cost of gain. Some producers have indicated that their cattle sell below the average price at local livestock auctions and discovered through the program the reason why. On the other hand, some producers indicated that coat color or breed type resulted in excess discounts at livestock auction, and based on feedyard cost of gain and carcass value, their cattle were worth more at weaning than the price typically received. The objective of this study was to evaluate the effects of categorizing initial calf market value and gross return from feeding (carcass value minus feedyard expenses) into above or below average groups on visual, growth, and carcass characteristics.

Experimental Procedures

Performance records for 2001, 2002, and 2003 were extracted from the Arkansas Steer Feedout database. The records represent cattle being fed at a similar feedyard, Oklahoma Feeders, Coyle, Okla. Calves were placed on feed (November) and marketed (April to May) during similar times each year. Calves were marketed in groups based on when they reached a final body fat composition that was acceptable by the packer. Calves were processed at the Tyson plant in Emporia, Kan. Carcass data were collected by Kansas State University, and calves were marketed based on a carcass quality and yield grade grid. Market value upon entering the feedout program was assigned to each calf by the same Livestock Market News reporter across all three years. Calves that became sick, graded USDA Prime, dark cutters, small framed, or light muscled (USDA muscle score 3) were removed from the analysis based on limited observations. The final dataset consisted of 487 calves. Calves were separated into two groups (above or below average) within two different value categories. The first category was based on initial calf value (weight multiplied by price per unit of weight). The second category was based on gross return from feeding (carcass value minus feedyard expenses). Gross return above feedyard expenses was used for the second category instead of carcass value alone because the owner/buyer not only anticipates how the calf will perform on the rail but also factors in expectations of costs of gain when placing a bid price.

A combined category notation was based on above average (A) and below average (B). The first letter when presented in sets of two was the initial value category and the second was the gross return category. For example, AA means both the initial value (first A) and gross return (second A) were above average. Calves were assigned to their respective groups for both categories by year to remove any year effects as a result of changes in the cattle market. The average initial value was $479, $490, and $584/hd for years 2001, 2002, and 2003, respectively. The average gross return above feedyard expenses was $491, $592, and $681/hd for years 2001, 2002, and 2003, respectively. Both initial value and gross return were normally dis-

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tributed (PROC UNIVARIATE of SAS; SAS Inst., Inc., Cary, N.C.) within year.

Distribution of the calves within combined categories was determined using PROC FREQ of SAS. Effects of initial value or gross return categorization was determined for the dependent variables including initial BW, initial value per hundred-weight, muscle score, ADG, final BW, carcass value per hundred-weight, hot carcass weight, days on feed, dressing percentage, yield grade, ribeye area, ribeye area per hundred-weight, fat thickness, and net return (gross return above feedyard expenses minus initial value) by analysis of variance (PROC GLM of SAS). Categorization effects on percentage Brahman, English, and Continental influence within above or below average groups were determined by Chi-square analysis (PROC FREQ of SAS). Effect of categorization on incidence of frame size, quality grade, and coat color within above and below average groups was also determined by Chi-square analysis.

Results and Discussion

The percentage of cattle categorized by initial value and gross return, grouped as above or below average, were 33.1, 15.8, 17.4, and 33.7% for AA, AB, BA, and BB groups, respectively. Overall, 66.8% of the calves above or below average initial value going into the program had corresponding gross returns exiting the program (AA and BB). Seventeen percent of the cattle were worth more at the end of the program than their value at the beginning of the program (BA). These cattle, therefore, are commonly termed 'unfairly discounted' at the auction market. Alternatively, a similar percentage (15.8%) of calves where over-valued at the beginning of the program in comparison to their relative value at the end of the program (AB).

Few interactions occurred between initial value and gross return categories (Table 1) with the exception of days on feed, hot carcass weight, and carcass value. The interaction was not due to reversed trends, but changes from AA to AB were simply greater than the changes from BA to BB. In addition, the majority of the observations, 66.8%, were grouped above or below average for both initial value and gross return. Those calves with a below average initial value had a higher net return ($P < 0.001$) than the calves with above average initial value ($88.27 and $26.17/head, respectively). Cattle priced below average going into the feeding period were either discounted too heavily as a result of poor management or reduced feedlot performance and(or) carcass quality expectations; otherwise cattle that received above average initial value were anticipated to perform better than actual performance. In addition, the net return of AA was 224% above the net return for above average initial value calves; whereas, the net return of below average initial value calves was 141% above BB. This suggests the loss of net return associated with the AB calves may be having a larger impact on the net return of above average initial value calves in comparison to the gain in net return from the BA group on below average initial value. Despite above average initial value cattle being 118 lb heavier upon arrival ($P < 0.001$), value per hundred-weight did not differ ($P = 0.53$), suggesting that the above average initial value group was over-valued relative to the below average group. Cattle that had an above average gross return at the end of the feeding period were more profitable than cattle with a below average gross return at the end of the feeding period ($112.40 and $2.04/head net return, respectively).

Muscle expression was an important component in placing the initial value ($P < 0.001$). Calves with an above average initial value were heavier muscled (lower muscle score) than cattle with a below average initial value. The influence of muscle score was not different ($P = 0.97$) between above average and below average final gross return. There were more ($P < 0.001$) large-frame cattle in the above average initial value (AA+AB groups) than in the below average (BA+BB) initial value group (Table 2). Larger frame cattle are expected to finish at a heavier weight than moderate-frame cattle, and received above average value. However, calves that received above average initial value gained at a slower rate ($P = 0.01$) compared to those with below average initial value (3.0 and 3.2 lb/d, respectively). Calves with above average initial value were heavier upon arrival ($P < 0.001$), despite having a slower rate of gain, fewer days on feed (170 vs. 176 d, $P < 0.001$), and heavier final BW ($P < 0.001$) and hot carcass weights (757 vs. 714 lb, $P < 0.001$) than calves with below average initial value. The larger frame, heavier muscled, above average initial value calves also had larger ribeye area ($P < 0.001$), yet dressing percentage was less ($P = 0.03$) for above average initial value calves. Dressing percentage averaged 0.6 percentage units higher for below average initial value calves in comparison to above average initial value calves. Fat thickness ($P = 0.10$) and ribeye area per hundred weight of carcass ($P = 0.15$) was not different between above average and below average initial value. Likewise, yield grade was not different between above average and below average initial value ($P = 0.33$) or gross return ($P = 0.15$) categories.

More cattle in the above average initial value and gross return categories graded USDA choice (Table 2). The significance of group on quality grade was greater at the conclusion of the feeding period ($P < 0.001$) for above or below average gross return in comparison to initial value group effect ($P < 0.03$). Breed composition differed with initial value group, but not gross return or combined categories. Of the Brahman influenced cattle, 64% of calves with more than 25% Brahman influence fell within the below average initial value group ($P = 0.04$); however, cattle with more than 25% Brahman influence represented 13% of the 485 observations. Slightly more (52%) calves being 50% or greater Continental influence were above average initial value ($P = 0.07$). This probably compliments the emphasis on frame and muscle observed for calves with above average initial value as described earlier. The percentage of English influence was not related to initial value group ($P = 0.27$). Breed composition was not significant for above and below average gross return ($P > 0.30$).

Predominant coat color (Table 3) was influenced by initial value ($P = 0.03$) and gross return ($P = 0.02$) groups. Calves with predominately black coat color represented 49% of the observations and red coat color represented 26% of the observations. Brown, grey, white, and yellow cumulatively represented 25% of the observations. A higher percentage (52%) of the black coat color population fell within above average initial value in comparison to red coat color (36%). Likewise, a higher percentage of black coat colored cattle were categorized above average gross return, and red colored cattle continued to represent a higher percentage (61%) of below average gross return. There were not enough observations over the three years to evaluate the effects of coat color and breed influence combined; therefore, confounding of coat color and breed composition on categorization could be possible.

Implications

The majority of cattle in the Arkansas Steer Feedout Program that received above or below average initial value received corresponding above or below average gross returns. Cattle with above average initial value were characterized as being heavier muscled, larger framed and containing a higher percentage of black coat color and less than 25% Brahman influence. This group also had heavier carcass weights and a higher percentage grade USDA Choice. However, calves with above average initial value as a whole appeared less profitable than below average initial value calves, likely from over-valuing calves in the above average group and large losses associated with calves with above average initial value and below average gross return.

Table 1. Effect of grouping (above or below average) calf initial value and gross return on BW, value, growth performance, and carcass characteristics.

		Category/Group[a]				P-value[b]		
Item	n	AA	AB	BA	BB	I	G	I x G
Initial BW, lb	487	706	680	588	561	<0.001	<0.001	[illegible]
Initial value, $/cwt	487	82.79	80.92	80.25	81.43	0.53	0.13	0.96
Muscle score[c]	487	1.36	1.34	1.56	1.59	<0.001	0.97	0.60
ADG, lb	487	3.2	2.9	3.4	3.0	0.01	<0.001	0.19
Days on feed, d	487	165	176	174	179	<0.001	<0.001	[illegible]
Final BW, lb	487	1236	1197	1174	1096	<0.001	<0.001	[illegible]
Hot carcass weight, lb	487	782	733	751	677	<0.001	<0.001	
Carcass value, $/cwt	487	124.37	116.14	123.33	118.26	0.73	<0.001	0.30
Dressing percentage, %	487	63.3	61.2	64.0	61.8	0.03	<0.001	0.78
Yield grade	487	2.1	2.1	2.1	2.0	0.33	0.15	0.56
Ribeye area, sq in	480	13.2	12.8	12.7	12.2	0.001	<0.001	0.67
Fat thickness, in	480	0.46	0.39	0.44	0.36	0.10	<0.001	0.83
Ribeye/carcass sq in/cwt	480	1.69	1.74	1.70	1.80	0.15	0.002	0.27
Net return[d], $	487	84.83	-32.48	139.98	36.56	<0.001	<0.001	0.31

[a]AA = above average initial value, above average gross return; AB = above average initial value, below average gross return; BA = below average initial value, above average gross return; and BB = below average initial value, below average gross return.
[b]I = initial value (A, above or B, below average); G = gross return (A, above or B, below average); and I x G = initial value by gross return interaction.
[c]USDA muscle score system (1 to 4 system with 1 being heaviest muscled).
[d]Net return = gross return minus initial value.

Table 2. Distribution of frame size, quality grade and breed composition within initial value and gross return calf groups (above or below average value).

		Category/Group[a] (% all calves)				Chi-square P-Value		
Item	n	AA	AB	BA	BB	I	G	I+G
Frame						<0.001	<0.001	< 0.001
Large	189	18	7	5	8			
Medium	298	15	8	12	26			
Quality Grade						0.03	<0.001	< 0.001
Choice	228	23	2	13	9			
Select	226	9	12	4	20			
Standard	33	1	2	1	4			
Breed Composition								
Brahman						0.04	0.96	0.15
25% or less	422	30	14	14	29			
Greater than 25%	63	3	1	3	5			
Continental						0.07	0.92	0.24
Less than 50%	280	18	8	12	20			
50% or greater	205	15	7	6	14			
English						0.27	0.34	0.65
Less than 50%	138	8	4	5	11			
50% or greater	347	24	12	13	23			

[a]AA = above average initial value, above average gross return; AB = above average initial value, below average gross return; BA = below average initial value, above average gross return; and BB = below average initial value, below average gross return.
[b]I = initial value (A, above or B, below average); G = gross return (A, above or B, below average); and I + G = initial value and gross return combined.

Table 3. Distribution of predominate coat color within initial value and gross return calf groups (above or below average value).

		Category/Group[a] (% all calves)			
Predominant coat color[b]	n	AA	AB	BA	BB
Black	237	18	7	9	14
Brown	17	1	1	1	1
Grey	44	4	1	2	2
Red	128	5	4	5	12
White	23	2	1	1	1
Yellow	38	2	2	1	3

[a]AA = above average initial value, above average gross return; AB = above average initial value, below average gross return; BA = below average initial value, above average gross return; and BB = below average initial value, below average gross return.
[b]Chi-square, P-values: initial value (AA+AB vs. BA+BB, P = 0.03), gross return (AA+BA vs. AB+BB, P = 0.02) and initial value plus gross return combined (AA vs. AB vs. BA vs. BB, P = 0.10).