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Boxed Beef Value and Percentage Yield of Steers in the Oklahoma Steer Feedout Program

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Story in Brief

The OSU Boxed Beef Calculator was used to generate closely trimmed boxed beef value (VALUE) and percentage yield (YIELD) on 2,208 steers fed in the Oklahoma Steer Feedout program from 1990 to 1997. Wholesale prices reflected a 2-yr average (1995 to 1996) for the 19 boxed beef items. Nonconforming carcasses (i.e., YG 4.0 or) were priced separately. VALUE and YIELD were evaluated for differences due to season of birth and breed type. Data were analyzed using a model that included effects of year, season, year x season, sire type, and dam type. Year, season of production, and the year x season interaction were significant for VALUE and YIELD. Fall-born steers had higher VALUE than spring-born steers ($110.22 vs $109.10/cwt) for all years except 1995, despite a higher YIELD for spring-born steers. Seasonal differences may be attributed to the higher percentage of U.S. Choice carcasses from fall- vs spring-born steers (63.7 vs 55.2%, respectively). Categorization by sire breed type (Angus, ANG; other British, BRIT; Continental, CONT; Continental (milk), MCONT; Brahman Influence, BRAH) revealed that CONT and MCONT sired steers had a higher YIELD than ANG, BRIT, or BRAH. VALUE did not differ among ANG, CONT, or MCONT, but all had higher VALUE than BRIT and BRAH sired steers. Results indicate that season of birth and breed type affect boxed beef value and yield. Breed performance reflects trends in the OK Steer Feedout program and may not represent national breed differences.

(Key Words: Beef Cattle, Carcass, Value.)

Introduction

The beef industry is moving toward value-based marketing of live cattle. The change from traditional marketing methods of selling pounds of live animal create new targets for beef producers, not only in the finishing of cattle but throughout the production chain from cow-calf to end product. One challenge that must be met is to balance performance as well as the quality and quantity of red meat yield produced. Understanding breed strengths, biological cattle types, and management practices may help the beef industry to determine the best combination of performance and carcass characteristics in a value-based marketing system. Accordingly, the current study was conducted to evaluate sire breed type as well as season of production on profitability and boxed beef yield of steers fed in the Oklahoma Steer Feedout Program from 1990 to 1997.

Materials and Methods

Animals. Spring- and fall-born steer calves fed in the Oklahoma Steer Feedout from 1990 to 1997 (n = 2208) were used to determine closely trimmed (.25 in) boxed beef value and percentage of carcass weight that was boxed beef. Fall steers were born from late August to November and were placed on feed the following August. Spring calves were born from January to April and were placed on feed in early November. Prior to entering the feedlot, steers must have been weaned for a minimum of 3 wk, received proper vaccinations, and treated for horns, worms, grubs, and lice. Steers had free access to a high concentrate ration and were observed daily for health problems by feed yard personnel; those deemed "sick" were pulled and treated accordingly.

Steers were processed at a commercial meat packing facility when 60% of the calves were subjectively estimated to have a subcutaneous (external) fat thickness of 0.5 inch. Following a 40-h postmortem chill, data for yield and quality grade determinations (USDA, 1989) were

collected by Oklahoma State Cooperative Extension Service personnel.

Value and Yield Determination. The OSU Boxed Beef Calculator (Gardner et al., 1996) was used to generate closely trimmed boxed beef value and percentage boxed beef yield on steers fed in the Oklahoma Steer Feedout program from 1990 to 1997. Wholesale prices reflected a 2-yr average (1995 to 1996) for the 19 boxed beef items. A base price was established for all conforming carcasses ($110.79/cwt); nonconforming carcasses were priced separately. YG 4 and greater, carcasses <550, and carcasses 999 received a $15/cwt discount from the base price, while carcasses 949 but <1000 were discounted $5/cwt from the base price.

Initial value of each feeder steer was calculated using entry feedlot weight and the average 10-yr price for various steer classes from 1986 to 1995: <500 lb = $96.53/cwt; 500 to 599 lb = $88.19/cwt; 600 to 699 lb = $82.42/cwt; 700 to 799 lb = $79.11/cwt; 800 lb = $75.27/cwt. A single feed efficiency was assumed for each pen of steers fed in the Oklahoma Steer Feedout and feed intake was calculated by multiplying weight gained in the feedlot by the pen feed efficiency. Feedlot costs included a ration cost of $160/ton on a dry matter basis and a daily yardage fee of $0.05/head. Net profit was calculated by subtracting gross feeder steer price, feed and medicine costs, yardage, and accrued interest from the gross finished steer value. Net profit accounted for both actual and opportunity costs using a 9% interest rate. Profit per day of age was determined by dividing net profit by steer age at the time of harvest. Profit per day on feed was calculated by dividing net profit by the days each steer was fed during the feedlot period.

Accumulated data were analyzed for differences between spring- vs fall-born steers and for differences in sire breed type. Differences in cow breed type were considered by the model, but results were not reported. Differences among sire breed type groups were partitioned using means separation procedures upon obtaining a significant F-test.

To determine sire breed difference, steers were grouped into one of five breed type classes. Sire breed types were: Angus (ANG) = Angus and Red Angus; British (BRIT) = Hereford (horned and polled) and Shorthorn; Continental (CONT) = Blonde d Aquitaine, Chianina, ChiAngus, Charolais, and Limousin; Milk Continental (MCONT) = Devon, Gelbvieh, Maine Anjou, Salers, Simmental, and Tarentaise; Brahman influenced (BRAH) = Brangus, Beefmaster, Charbray, Gelbray, Noble Line, Red Brangus, Santa Gertrudis, Senepol, and Simbrah.

Results and Discussion

Mean, minimum, and maximum values as well as standard deviations for live performance, carcass traits, and profitability characteristics are summarized in Table 1. Net profit ranged from a loss of -$360.54 to a gain of $284.35 per head. Carcass weight, marbling score, ribeye area, and fat thickness ranges indicate that non-conforming cattle exist in the Feedout mix, even though average performance may be acceptable. Net return of steers unacceptable in carcass weight (<550 or 950 lb), yield grade (4.0), or quality grade (U.S. Standard) averaged $108.63 less than their conforming counterparts (-$82.97 vs $25.66). Steer Feedout data prior to 1990 were summarized by Barnes et al. (1992).

Spring- vs Fall-born Steers. Year, season, and the year x season interaction were siginificant sources of variation (P<.05) for boxed beef value and yield. Table 2 presents mean live performance, carcass, and value characteristics for spring- and fall-born steers. Spring steers had lighter starting weight, final weight, and carcass weight, as well as a lower percentage of carcasses qualifying for the U.S. Choice quality grade. Although boxed beef percentage favored the spring-born group, fall-born calves had a $25 per head net profit advantage. Seasonal differences in profitability were attributed to quality grade differences between the two groups.

Steers Categorized by Sire Breed Type. Table 3 summarizes mean performance by sire breed type. Continental and Continental Milk sired steers had greater boxed beef yield percentage than other sire breed groups. Boxed beef value did not differ significantly among Angus type or

Continental groups, but these three groups excelled in boxed beef value in comparison with British and Brahman influenced sire groups. Results indicate breed group differences in the Oklahoma Steer Feedout cattle mix, after accounting for dam breed type. However, interactions of sire and breed type were not accounted for due to partial confounding of these factors.

Implications

Boxed beef value and percentage yield from steers vary among sire breed types and season of production. Although sire breed type differences were evident in the Oklahoma Steer Feedout steer data, it is important to consider these results as a "snapshot" of performance in the beef production chain. Breed performance may not represent national differences. Also, inferences do not consider an integrated production system from cow-calf operation to end product.

Literature Cited

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Table 1. Characteristics of all steers (n = 2208) fed in the OK Steer Feedout from 1990 to 1997.

Item	Mean	Minimum	Maximum	SD
In wt, lb	640	371	965	100.18
Sale wt, lb[a]	1127	686	1579	124.45
Final age	430	330	719	37
Days fed	165	132	188	12.84
ADG, lb	3.39	1.35	5.19	.54
Carcass wt, lb	716	439	1018	84.92
Dressing %	63.5	50.6	77.5	2.18
Fat thickness, in	.35	.05	1.00	.16
Ribeye area, in^2	12.5	8.0	17.2	1.48
KPH fat, %	2.3	1.0	3.7	.51
Yield grade	2.5	.9	5.0	.65
Marbling score[b]	Sm^{09}	Tr^{90}	MAb^{10}	65.93
Live $/cwt	70.13	55.20	91.66	4.55
Carcass $/cwt	109.90	95.48	140.33	6.65
Boxed beef, % cwt	69.33	62.49	82.03	2.34
Net profit, $/hd	21.52	-360.54	284.35	66.20
Profit/day of age	.049	-.85	.61	.15
Profit/day on feed	.132	-2.02	1.85	.40

a Sale weight = gross weight * .96.

b Marbling score: " MAb" = moderately abundant, the minimum required for U.S. average prime; " Sm" = small, the minimum required for U.S. Choice; " Tr" = traces, the requirement for U.S. Standard (USDA, 1989).

Table 2. Least squares means of spring and fall-born steers fed in the OK Steer Feedout from 1990 to 1997.

Item	Spring	Fall	P =
Steers	1562	646	
In wt, lb	629	683	.0001
Sale wt, lb[a]	1102	1178	.0001
Final age, d	413	468	.0001
Days fed	167	162	.0001
ADG, lb	3.29	3.53	.0001
Carcass wt, lb	702	748	.0001
Dressing %	63.6	63.4	.115
Fat thickness, in	.34	.38	.0001
Ribeye area, in^2	12.4	12.9	.0001
KPH fat, %	2.3	2.4	.0006
Yield grade	2.5	2.6	.0001
%YG1	20.4	18.9	
%YG2	59.7	57.6	
%YG3	19.5	22.3	
%YG4	1.2	2.6	
Marbling score[b]	Sl^{99}	Sm^{15}	.0001
% Prime	.8	1.6	
% Prem Choice	12.2	7.7	
% Low Choice	43.0	56.0	
% Select	43.3	34.2	
% Standard	.8	.5	

Live $/cwt	69.81	70.25	.039
Carcass $/cwt	109.10	110.22	.0004
Boxed beef, % cwt	69.53	68.88	.0001
Net profit, $/hd	12.36	37.20	.0001
Profit/day of age	.030	.081	.0001
Profit/day on feed	.076	.225	.0001

a Sale weight = gross weight * .96.

b Marbling score: " Sm" = small, the minimum required for U.S. Choice; " Sl" =slight degree, the minimum required for U.S. Select.

Table 3. Characteristics of steers fed in the OK Steer Feedout from 1990 to 1997 stratified by sire breed type.

Item	Angus	Brahman Influence	British	Continental	Continental Milk
Steers	694	385	216	191	722
In weight, lb	664^{b}	647^{c}	620^{d}	687^{a}	65^{cb}
Sale weight, lb^{f}	1148^{b}	1115^{c}	1115^{c}	1169^{a}	1154^{ab}
Final age, d	442^{bc}	438^{c}	429^{d}	449^{a}	443^{b}
Days fed	160^{d}	165^{c}	156^{e}	171^{a}	169^{b}
ADG, lb	3.54^{a}	3.26^{c}	3.50^{a}	3.35^{bc}	3.40^{b}
Carcass wt, lb	729^{b}	709^{c}	704^{c}	750^{a}	733^{b}
Dressing %	63.4^{bc}	63.6^{b}	63.1^{c}	64.1^{a}	63.5^{b}
Fat thickness, in	.40^{a}	.37^{b}	.37^{ab}	.33^{c}	.30^{c}
Ribeye area, in^{2}	12.6^{c}	12.2^{d}	11.8^{e}	13.6^{a}	13.0^{b}
KPH fat, %	2.3^{b}	2.4^{a}	2.1^{d}	2.4^{ab}	2.3^{c}
Yield grade	2.7^{a}	2.7^{a}	2.7^{a}	2.3^{b}	2.3^{b}
%YG1	10.2	15.8	7.4	34.0	31.4
%YG2	63.4	51.2	66.2	57.1	57.6
%YG3	25.5	29.1	26.4	9.9	11.5

%YG4	1.4	4.7	1.9	.5	.3
Marbling score[g]	Sm[32a]	Sm[08 b]	Sl[91 c]	Sm[00 bc]	Sm[05 b]
% Prime	2.3	1.3	.0	.0	.1
% Prem Choice	20.6	8.3	4.6	5.2	6.2
% Low Choice	52.3	44.2	53.7	38.7	43.1
% Select	24.4	45.2	41.2	55.5	49.7
% Standard	.4	1.0	.5	.5	.8
Live $/cwt	70.48[b]	69.41[c]	68.18[d]	71.47[a]	70.63[b]
Carcass $/cwt	110.62[a]	108.18[b]	107.32[b]	111.14[a]	111.04[a]
Boxed beef, %	68.65[b]	68.76[b]	68.71[b]	70.06[a]	69.84[a]
Net profit, $/hd	34.16[ab]	10.30[c]	6.03[c]	43.98[a]	29.44[b]
Profit/day of age	.21[ab]	.06[c]	.04[c]	.26[a]	.17[b]
Profit/day on feed	.077[ab]	.023[c]	.015[c]	.099[a]	.064[b]

a,b,c,d,eMeans in the same row with a common superscript letter do not differ(P.05).

f Sale weight = gross weight * .96.

gMarbling score: " Sm" = small, the minimum required for U.S. Choice; " Sl" = slight degree, the minimum required for U.S. Select.

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