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Kansas Steer Futurities - The Record on
Retained Ownership 1974-1983¹

Chuck Lambert, Danny Simms,² Bob Schalles, Larry Corah,
Gerry Kuhl and Mike Sands

Summary

Spring born steer calves, weaned and delivered to custom feedlots by Kansas producers, were fed to slaughter weight. Gain and carcass information was gathered on over 5,000 head fed in 53 separate tests since the fall of 1974.

Retaining ownership of steers through the feedlot phase has been profitable for producers in six of the last nine years, and in only two years have losses been large. Those same calves, if sold at weaning, would have been profitable in only three of the last nine years, using Kansas Farm Management Association average costs of production.

The cattle averaged 59 percent USDA Choice and 98.3 percent USDA Yield Grade 3 or trimmer carcasses. Death loss averaged 1.2 percent over the nine years.

Breed groups with the ability to gain rapidly and grade USDA Choice were most profitable. There was an \$86.63 difference in profit and a .7 lb per day difference in gain from the low to high gaining breed groups.

Profit increased as yearling hip height and rib eye area increased while carcass quality grade and fat thickness decreased. Profitability leveled out when yearling hip height exceeded 47 inches, rib eye area exceeded 13.5 sq. in. and quality grade went below 50 percent Choice.

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Smith/Jewell County Futurities - Bill Wood and Wilbur Dunavan - Headrick
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² Extension Livestock Specialist, Northwest Kansas.

Introduction

The Kansas steer futurity program is a concept where producers can test calves for gain and profitability through the feedlot phase. It was implemented at two Kansas locations in the fall of 1974. Since then, the Extension-sponsored program has been expanded to several test sites throughout Kansas.

The goal is to give producers an opportunity to evaluate cattle for post-weaning gain and carcass characteristics. Purebred cattle breeders can identify superior lines by testing sire progeny groups, and commercial cattlemen can compare different breeds and crosses. Both purebred and commercial producers can also test, on a limited basis, the profitability of retaining ownership from birth through the feedlot.

Procedure

Fifty-three futurities involving over 5,000 spring-born steer calves have been held since 1974. Calves were weaned and delivered to futurity test sites, usually during November. Nearly all tests were held at commercial custom feedlots, with consignors' cattle fed together in one or two pens. Cattle were weighed on arrival and processed according to the individual feedlot's management program.

Most futurities allowed a two- or three-week warm-up period to equalize predelivery management effects. Cattle were then individually weighed for an official test starting weight and fed to slaughter weight on typical rations used by the feedlot. At some tests, after about 100 days on feed, cattle were weighed and hip height measured.

Producers consigning cattle received rate of gain and carcass information at the end of the test. Producers were billed directly by the feedlot for feed, medical and yardage costs and were paid directly by the packer on a carcass value basis. With those figures, producers could tabulate cost per pound of gain and profit per head, based on their individual costs of producing calves to feedlot delivery time.

Futurity cattle were marketed when management of the test felt they were of acceptable weight and fat thickness. To allow for differences in maturity patterns of various breeds and types of cattle, there were normally two or three slaughter dates for each test. Normal selling time was May through June when cattle were approximately 15 months old.

For this summarization, individual breeds were grouped using the U.S. Meat Animal Research Center classification for mature size and growth rate. Breeds classified into each grouping were:

Large Continentals (LC) - Beef Friesian, Charolais, Chianina, Maine Anjou, Marchigiana and Simmental.

Medium Continentals (MC) - Gelbvieh, Blonde D-Aquitaine and Beef Brown Swiss.

Small Continentals (SC) - Limousin, Pinzgauer, Salers, South Devon and Tarentaise.

British - Angus, Red Angus, Hereford, Polled Hereford and Shorthorn.

Cattle with 75 percent or more of any one breed were considered purebred. Crosses of breeds within each group were considered to be of that same grouping (for instance, Angus X Hereford were British, Simmental X Charolais were LC). Crosses of breeds from different groups were given separate classifications (for instance, Charolais X Angus were LC X British). Cattle with Brahman breeding were grouped into a separate category called Brahman crosses. This group included Santa Gertrudis, Brangus, Beef Master and Brahman sires crossed on Charolais, Simmental, British and crossbred cows. Longhorn crosses were left as a separate category.

Cattle also were divided by frame score without regard to breed designation. Frame scores were calculated from hip height measurements. Frame 1 cattle were 37 to 39 in. tall at one year of age and each increment in frame score was equal to an increase of 2 in. in hip height.

Differences due to test location and year were eliminated statistically.

Results

Table 31.1. shows the "typical" steer fed through the Kansas futurity program during the last nine years. Overall average daily gain including the warm-up period was very near to the average daily gain on test. Compensatory gain was not a large factor in cattle of this age and weight. There may be large differences in performance in the early stages of the feeding period, but they did not have a large impact on overall growth rates.

When these tests were started, there was some concern that cattle fed to slaughter weight at a relatively young age would not have sufficient marbling to grade USDA Choice. Quality grade was recorded on 4,411 steers. Of those, 2,593 (59 percent) graded USDA Choice, and 13 (.2 percent) graded USDA Prime. Percent Choice ranged from 41.6 percent in 1975 to 69.4 percent in 1977. In three of the four years that futurity cattle did not grade 60 percent Choice (1975, 1978 and 1979), per head profits were \$85 or more. While cattle of this type have potential to grade 60 percent Choice, 98.3 percent also produced Yield Grade 3 or trimmer carcasses.

Another producer concern during the early years of these tests was death loss from feeding calves in commercial feedlots. In the nine years of these tests, 52 calves (1.15%) died and another 24 head (0.5%) were removed and salvaged. The total removal rate of 1.65% compares with rates normally experienced by custom feedlots.

Table 31.2 shows large fluctuations in cattle prices, interest rates and cow carrying costs over the nine years Kansas futurities have been held. Values for steer calves at feedlot delivery time have ranged from less than \$150 per head in the "wreck of '74" to over \$500 per head in the fall of 1979. Records from the Kansas Farm Management Association are used to average the cost of producing the calf to feedlot delivery time.

In 1978-79 and 1979-80 steer calf values were over \$400 per head at delivery time, and annual cow costs were less than \$300; net returns at weaning were \$100 per head or more. In 1980-81 steer calf values were nearly \$450 per head, but annual cow costs had jumped to \$350, and net return dropped to \$21 per head. The cow-calf producer has shown positive returns at weaning time in only three of the last nine years.

Interest rates on feeder cattle loans have nearly tripled over the last nine years. In 1974-75, with steer calf values of less than \$150 per head and interest rates at 6.5 percent, the interest cost of owning the calf was 2.2 cents per day. In 1979 to 1981, with calf prices at \$450 to \$500 per head and interest rates in the 15 to 16 percent range, the per head interest cost was approximately 22 cents per head per day.

Economic data from the feedlot phase are incorporated with calf production costs in Table 31.3. In 1974-75, 1977-78 and 1981-82 positive returns from finishing steer calves more than made up for negative returns at weaning. In 1976-77 and 1982-83 small positive returns from finishing helped reduce larger negative returns at weaning. In 1975-76 a small loss during finishing increased an already large negative return at weaning. Large positive returns from retained ownership in 1978-79 increased the even larger positive returns at weaning. Only in 1979-80 and 1980-81 did retaining ownership actually cause a large decrease in positive returns available at weaning.

Producers selling calves at weaning would have lost money in six out of the last nine years. Those retaining ownership of steer calves through the feedlot phase in Kansas Steer futurities experienced positive returns in six of the last nine years. Only in two years (1979-80 and 1980-81) were losses large due to retained ownership.

BREED COMPARISONS

This was not a scientifically designed test to determine the value of various breeds. Rather, the results represent the averages for selected cattle consigned by various producers over the nine years of the steer futurity program. A performance summary of the 26 breeds and crosses evaluated can be obtained by contacting Animal Science Extension, Weber Hall, KSU, Manhattan, KS 66502.

More important than ranking individual breeds is identifying the traits making some breeds more profitable. The more profitable cattle were generally crossbreds, and cattle with relatively heavier starting weights — an indication of pre-weaning gain ability of the calf and milking ability of its dam. A combination of heavy starting weight, continued gain after arrival at the feedlot, and relatively high dressing percentage was reflected as heavier carcass weights. A 20 pound increase in carcass weight produced \$17 more in profit per head.

The ability of breeds to grade USDA Choice and gain rapidly was economically important. Premiums for USDA Choice over Good grade cattle were reflected in the profitability formula because actual carcass grade prices were used in determining the final values.

Five traits separated the five most profitable beef breeds from the five least profitable ones: 1) The top five had starting weights of 625 lbs or more; the bottom five weighed 585 lbs or less. 2) Average daily gain for the five most profitable was 3.0 lbs or more; the five least profitable averaged less than 3.0 lbs per day. Profit increased an average of \$2.80 per head for each .1 lb increase in average daily gain. 3) Carcass weights for the five most profitable breeds were 708 lbs or more and for the bottom five were 649 lbs or less. 4) Quality grades were similar for the top and bottom five breeds in profitability. 5) Four of the five least profitable breeds had over .4 inch backfat while only one out of five of the most profitable breeds exceeded .4 inch. Profit differed \$86.63 and average daily gain over .7 lb/day from the low to high beef breed.

Because futurity cattle were sold on a carcass basis, dressing percentage was an important profitability factor. A 1 lb increase in carcass weight resulted in a \$.85 increase in profit. A 1.5 percent increase in dressing percent from a steer weighing 1,150 lbs would yield 17.25 lbs more carcass or an increase of \$14.66 profit per head.

Table 31.4 compares breed groups combined using the MARC classification of breeds by mature size and growth rate. Larger frame breed groups had heavier starting and carcass weights, larger ribeye areas, faster average daily gains and were more profitable. As frame size increased, fat thickness and quality grade decreased. All breed groups averaged USDA Yield Grade 2 — an indication that cattle were being marketed at a common end point by test managers. British cattle showed more external fat in spite of the shortest time on feed.

Faster gaining cattle were generally more profitable. However, other factors combine to influence profitability. Small Continentals (SC) posted a 3 lb average daily gain, and had the largest ribeye areas and trimmest yield grade. But they also had the lowest quality grade, which resulted in the lowest profitability. A combination of 3.17 lb gain per day and an average quality grade of 6.9 (90% USDA Choice - or better) in the MC X British cattle was the most profitable among breed groups.

Cattle also were divided by frame score without regard to breed designation as shown in Table 31.5. As frame score increased from 1 to 8, starting weight increased from 496 to 752 pounds, average daily gain increased from 2.58 lbs to 3.50 lbs per day, ribeye area increased from 11.9 sq. in. to 14.3 sq. in. and carcass weight increased from 571 to 801 pounds. Increased hip height or frame score also is associated with decreased fat thickness, a leaner USDA yield grade, and a corresponding decrease in USDA quality grade.

Differences in dressing percentage among individual breeds were not reflected by frame score categories. However, the fatter, smaller-framed cattle showed slightly higher dressing percentages than the larger-framed, trimmer cattle.

There appears to be a diminishing return for frame sizes above 6 (yearling hip heights above 47 to 49 inches). Average daily gain and ribeye area increase as frame size increases above 6, but profit does not increase accordingly. Quality grade also decreased below 50% USDA Choice as frame size increased above 6, and increased gain did not compensate for the decreased quality grade.

Muscling of the cattle as indicated by ribeye area was nearly 3 times ($r = .32$) more highly correlated to average daily gain than to frame score ($r = .13$). Based on steers fed through the Kansas Futurities, profit potential reaches a plateau when cattle reach 47 inches tall at the hip at one year of age or when rib-eye reaches 13.5 sq. in.

Table 31.1: Average Results of the Steer Futurities in Kansas

<u>Birth date</u>	<u>Feedlot delivery date</u>	<u>Delivery weight</u>	<u>Warmup period</u>	<u>Weight on feed</u>	<u>Days on feed</u>	<u>Daily gain on test</u>	<u>Selling date</u>
Feb. 23	Nov. 7	585 lbs	17 days	636 lbs	167	3.08 lbs	June 1
<u>Selling weight</u>	<u>Dressing percent</u>	<u>Carcass weight</u>	<u>Overall daily gain</u>	<u>Rib eye area</u>	<u>Percent kidney knob</u>	<u>Yield grade</u>	<u>Quality grade</u> ¹
1148 lbs	61.0	699 lbs	3.06 lbs	12.78 sq. in.	2.7	2.48	6.53

¹6 = high Good; 7 = low Choice.

Table 31.2. Annual Economic Data Pertaining to Retained Ownership vs. Sale of Calves at Weaning

Year	Actual weight at delivery	Price/cwt. at delivery (November)	Value at delivery	Estimated ¹ annual cash costs of cow ownership	Estimated ² returns for calves sold at delivery Date	Returns minus annual cow costs	Interest ³ Rate	Interest Cost (feeder)
1974-75	524	\$27.70	\$145.15	\$221.67	\$124.10	-\$97.57	6.5%	\$4.83
1975-76	552	37.44	206.67	223.96	168.32	-55.65	8.0	8.88
1976-77	583	37.37	217.87	228.85	176.93	-51.92	8.8	9.72
1977-78	589	40.95	241.20	221.52	201.20	-20.32	8.9	11.29
1978-79	590	69.45	409.76	244.21	342.35	98.14	10.1	21.77
1979-80	573	88.18	505.27	296.07	416.57	120.50	14.7	39.00
1980-81	576	77.14	444.33	348.93	370.70	21.77	16.6	37.18
1981-82	605	64.35	389.32	345.27	327.04	-18.23	17.2	31.00
1982-83	598	64.85	387.80	345.31	321.58	-23.73	14.3	27.35

¹Based on average costs from Kansas Farm Management Association records. Feed costs were calculated at market rates. Interest charges assumed a 60 percent debt on operating expenses and livestock. Interest on breeding stock was calculated on the estimated cow value + 16 percent of replacement heifer value + 4 percent of estimated bull value. Costs did not include a charge for operator labor, depreciation on buildings or equipment or a return on the 40 percent investment equity.

²Returns were based on a 92 percent calf crop. Therefore, sales included 46 percent of a steer calf; 30 percent of a heifer calf (16 percent held for replacement), cull cow sales of 14 percent per year and a 2 percent death loss.

³From Federal Reserve Bank of Kansas City, average interest rates on feeder calf loans, first two quarters of each year, Kansas City area.

Table 31.3. Average Annual Costs and Returns From Retained Ownership of Futurity Steers

Year	Feedlot costs	Feedlot costs plus interest	On farm ¹ weaning period	Total feeding costs	Return ² at slaughter	Returns minus annual cow costs	Return ³ from feeding	Total lifetime return
1974-75	237.59	242.42	9.22	251.64	525.75	-97.57	128.96	31.39
1975-76	215.56	224.44	8.15	232.59	432.35	-55.65	-6.91	-62.55
1976-77	208.16	217.88	8.40	226.28	450.15	-51.92	6.00	-45.92
1977-78	213.21	224.50	8.35	232.85	591.58	-20.32	117.53	97.21
1978-79	224.34	246.11	9.15	255.26	753.74	98.14	88.72	186.86
1979-80	239.08	278.08	10.45	288.53	710.96	120.50	-82.85	37.66
1980-81	320.86	358.04	14.12	372.16	737.80	21.77	-78.69	-56.92
1981-82	255.33	286.33	12.43	298.76	808.95	-18.23	120.87	102.64
1982-83	301.59	328.94	13.22	342.16	739.24	-23.73	9.28	-14.45
				Weighted means		- 3.00	33.66	30.66

¹Costs for on-farm weaning expenses calculated at one half the average daily feedlot cost of cattle on feed, for 14 days.

²Return at slaughter = Carcass price x Carcass weight, adjusted for death loss (average 1.15 percent).

³Return from feeding = Return at slaughter - Total feeding cost - Value at delivery.

Table 31.4. Performance of Futurity Steers Categorized by Breed Groups

Item	Small Continentals		Smaller Continentals	Medium Continentals		Large Continentals		Brahman X's	Longhorn X's
	British	X British		X British	X British	X British	Large Continentals		
No. steers	969	268	32	70	1748	921	159	79	
Profit, \$	54.67	67.68	37.86	87.59	69.12	71.45	59.82	49.58	
Starting weight, lb	594	595	561	631	633	647	633	541	
Frame score	3.9	3.9	4.7	4.2	4.9	5.4	5.1	3.3	
Average daily ₁ gain, lb	2.82	3.03	3.00	3.17	3.10	3.17	2.97	2.47	
Quality grade	6.8	6.8	6.0	6.9	6.6	6.2	6.5	7.0	
Carcass weight, lb	646	677	659	723	709	731	696	603	
Dressing percent	61.2	61.2	61.3	61.9	61.3	61.2	61.0	61.4	
Fat thickness, in.	.50	.36	.30	.41	.36	.30	.39	.32	
Ribeye area, sq. in.	11.9	13.0	13.6	13.2	12.9	13.4	12.6	11.7	
Yield grade	2.82	2.31	2.02	2.44	2.38	2.17	2.61	2.35	
Days fed	164	171	173	172	171	174	172	176	

¹6 = USDA high Good; 7 = USDA low Choice.

Table 31.5. Effect of Frame Score on Steer Performance in Kansas Futurities

Item	FRAME SCORE							
	1	2	3	4	5	6	7	8
No. steers	22	127	305	526	593	483	203	56
Yearling hip height, in.	37-39	39-41	41-43	43-45	45-47	47-49	49-51	51-53
Profit, \$	\$53.29	61.50	61.46	65.43	75.73	82.51	85.57	84.86
Starting weight, lb	496	536	576	602	641	683	706	752
Average daily ₁ gain, lb	2.58	2.75	2.84	3.08	3.24	3.37	3.43	3.50
Quality grade	7.3	7.2	7.0	6.8	6.7	6.5	6.4	6.1
Carcass weight, lb	571	605	634	672	716	757	777	801
Dressing percent	61.3	61.3	61.1	6.1	61.2	61.2	61.1	61.0
Fat thickness, in.	.42	.44	.44	.42	.39	.37	.32	.31
Ribeye area, sq. in.	11.9	11.9	12.1	12.8	13.4	13.7	13.9	14.3
Yield grade	2.5	2.6	2.6	2.5	2.4	2.4	2.2	2.2
Days fed	172	166	165	162	163	165	167	162

¹6 = USDA high Good; 7 = USDA low Choice.