

# Improving the Value of Your Calf Crop

The Impact of  
Selected Characteristics  
on Calf Prices



Cooperative Extension Service • Kansas State University • Manhattan

## Introduction

Research shows that many factors affect feeder cattle prices. External supply and demand determinants and physical characteristics of cattle sold at an individual market on a particular day combine to influence feeder cattle auction prices. Studies conducted by Kansas State University in 1986/1987 and 1993 found weight, lot size, health, condition, fill, muscling, frame size, breed, time of sale, market location, and feeder cattle and corn futures prices significantly influenced the prices of 300 to 599 pound steer and heifer calves at Kansas auctions. Results also showed a structural change occurred between 1986/1987 and 1993 in the price-characteristics relationship for 300-599 pound calves sold at Kansas auctions.

Cow-calf producers can improve the sale prices for weaned steer and heifer calves by carefully managing their calf crop before marketing time.

- Cow-calf producers can make the greatest increase in the sale

prices of weaned calves by producing and marketing healthy calves. The largest discounts were assessed to calves in both time periods that were sick, had bad eyes, lame, or had lumps. Viewed differently, buyers paid large premiums for healthy calves. Herd health management programs designed to ensure a healthy calf will increase the value of the calf crop.

- Cattle producers should take care not to market calves that are in extremely thin or fat condition. Large price discounts existed for calves not in average condition. In addition, some buyers may assume calves in extremely thin condition also have health problems.
- Cow-calf producers can avoid large price discounts through genetic selection and management practices if they reduce or eliminate the incidence of small framed or light muscled calves. Buyers were willing to pay large premiums for heavily muscled feeder cattle. This

research further indicated buyers of light-weight calves paid the largest premiums for the most heavily muscled calves.

- Large price premiums can be realized if calves are marketed in lot sizes preferred by buyers. This research showed that buyers preferred light-weight steers and heifers marketed in lot sizes ranging from 40 to 65 head.

## Data and Methods

To test whether characteristic values changed over time, data were collected at two different stages in the cattle cycle: fall 1986/spring 1987 and spring and fall of 1993. Data were collected at seven weekly Kansas feeder cattle auctions in 1986/1987: Dodge City, Fort Scott, Manhattan, Parsons, Pratt, Russell, and Salina. Eight markets were included in the 1993 study: Dodge City, Junction City, Manhattan, Oakley, Parsons, Pratt, and WaKeeney, Kansas, and Joplin, Missouri. Figure 1 illustrates the geographic distribution of the

**Figure 1. Markets Involved in 1986-87 and 1993 Feeder Cattle Studies**



participating markets. Evaluators for both data collection periods received the same training, facilitating comparisons across periods. Fall 1986 data were collected from October 29 through December 13, and spring 1987 data were collected from March 19 through April 15. Data collection during 1993 took place from March 15 through April 17 and from November 1 through December 11.

Evaluators recorded price per hundredweight for each lot. Individual lots of cattle were evaluated with respect to ten animal characteristics (sex, breed, frame size, muscling, fill, condition, horns, health, uniformity, and average weight per head). Data recorded for each lot also included the time of sale, lot size, market location, nearby feeder cattle futures price, and nearby corn futures price. The combined data set consisted

of information collected on 23,516 lots of light-weight steers and heifers for a total of 154,094 head. Forty-four percent of the lots were sold in 1986/1987 and 56 percent were marketed during 1993. Fifty-five percent of the cattle were steers and 45 percent were heifers in 1986/1987 compared with 54 percent steers and 46 percent heifers in 1993. During 1986/1987, 58 percent of the cattle sold in the fall and 42 percent in the spring whereas 49 percent of the cattle sold in the fall and 51 percent in the spring during 1993.

Changes in the general price level across the seven years between the two data sets were accounted for by deflating feeder lot price and the feeder cattle and corn futures prices using the USDA NASS Production Items price index (1993=100). This enabled researchers to examine price dif-

ferences over time in real terms, independent of inflation.

The physical characteristics and external market conditions examined in this study accounted for approximately 60 percent of the variation in light-weight feeder cattle prices. Tables 1 through 8 report the price changes attributable to specific characteristics for light-weight steer calves. Tables 9 through 16 detail premiums and discounts for weaned heifer calves. All figures in this bulletin should be used as a **part** of the decision-making process, not as the sole selection tool with respect to any feeder cattle characteristic.

Statistical tests were conducted to decide whether discounts and premiums were statistically different from zero. Premiums and discounts having at least a 95 percent probability of being different from zero are identified in

*Table 1. Effects of Breed on Weaned Steer Prices, 300-599 Lbs. (1993 \$)*

Breed	1986/1987		1993	
	Percent of Pens (%)	Price Change (\$/cwt)	Percent of Pens (%)	Price Change (\$/cwt)
Hereford	13.2	Base	7.6	Base
Angus	10.9	-2.16*	9.4	1.38*
Hereford-Angus crosses	25.4	0.78*	13.7	2.70*
Other English crosses	2.0	-3.16*	1.7	1.56*
Exotic crosses	26.2	1.13*	44.9	3.63*
Brahman, 1/4 or less	5.7	-2.18*	6.9	-0.53
Brahman, more than 1/4	2.1	-8.74*	1.6	-8.31*
Dairy	3.9	-10.66*	4.0	-8.49*
Longhorn	1.6	-8.82*	1.5	-9.35*
Mixed breeds	9.1	-0.83*	8.7	1.15*

\*Indicates significantly different from zero at the .05 level.

the tables with an asterisk. Consequently, price differentials not noted with an asterisk should not be relied upon since they have a greater than five percent probability of not being statistically different from zero. Each table reports the price changes, positive or negative, associated with the presence of a trait relative to a “base” animal. All premiums and discounts are relative to a healthy, large framed, heavily muscled Hereford calf without horns that sold in average fill and flesh during the first quarter of the sale at market location one.

## Genetic Characteristics

Long before the birth of a calf, genetic decisions made by cow-calf operators determine many of the calf’s characteristics. Breed, muscling, and frame size are important feeder cattle characteristics that are tied closely to genetic selection. Remembering that the product—a weaned steer or heifer—begins with sire selection, commercial and purebred cattle producers should consider bull selection and mating decisions carefully.

**Breed impacts on price:** Breed premiums and discounts are reported in tables 1 and 9. Price differences across breeds generally differed across the two periods. Compared with Hereford cattle, light-weight Angus steers and heifers sold at a discount in 1986/1987, but these animals sold at premiums to Herefords in 1993. Light-weight feeder calves with less than one-fourth Brahman breeding were discounted relative to Herefords in 1986/1987; however, in 1993, prices paid for these cattle were not significantly different from those paid for the base Hereford cattle.

When compared with the base breed Hereford, real price changes among the remaining breed categories changed very little. Exotic crosses continued to sell at a premium, while feeder calves with dairy, Longhorn, or more than one-fourth Brahman breeding were heavily discounted. Although the premiums and discounts associated with several breeds are considerable, it must be remembered that breeds should be selected to match cattle with the production environment and management practices employed on individual operations to make the most profitable use of available resources.

**Effect of muscling on feeder cattle price:** Feeder cattle buyers prefer heavily muscled feeder steers and heifers. Heightened concern about carcass quality in recent years has apparently led to larger discounts for cattle that are not heavily muscled. Price differentials associated with muscling are found in tables 2 and 10. The heavy muscling score was given predominantly to beef breeds while medium and light muscling scores were given primarily to dairy-bred cattle. Compared with heavy muscled feeder calves, medium and light muscled cattle received considerable price per hundredweight discounts. The magnitude of these discounts for steers in 1993 was consistent with those found in 1986/1987, but the discount assessed to light muscled heifers nearly doubled from 1986/1987 to 1993. In 1993, the heavy muscling designation was broken into upper-heavy and lower-heavy muscling categories. Extremely heavily muscled calves sold at a premium compared to calves with normal beef cattle muscling. This premium for the most heavily muscled calves seems to support the notion that feeder cattle buyers prefer heavily muscled cattle.

**Table 2. Effects of Muscling on Weaned Steer Prices, 300—599 Lbs. (1993 \$)**

Muscling Characteristic	1986/1987		1993	
	Percent of Pens (%)	Price Change (\$/cwt)	Percent of Pens (%)	Price Change (\$/cwt)
Heavy	94.8	Base	94.2	Base
Medium	5.0	-5.30*	5.5	-5.01*
Light	0.2	-18.04*	0.3	-20.83*

\*Indicates significantly different from zero at the .05 level.

***Influence of frame size on price:*** Frame size was determined by the weight the evaluator estimated an animal would finish. This study revealed a preference for large and upper-medium framed feeder cattle (tables 3 and 11). Large framed steers sold at a lower price than upper-medium framed steers whereas large framed heifers sold at a premium to all other frame sizes. Thus premiums were paid for cattle that would grade USDA Choice at

weights between 1,100 and 1,200 pounds. Discounts of approximately \$10 per hundredweight were assessed to small framed steers and heifers, suggesting buyers had concerns about purchasing cattle that might not be as efficient when placed on feed as larger framed feeders. Also, small framed cattle might not fit packer specifications for carcass size and quality resulting in discounts when small framed cattle are sold for slaughter.

## Herd Management and Nutrition Characteristics

Once a calf is born, the quality of the calf that is ultimately marketed depends on management. Herd management and nutrition programs play a large role in determining the marketability of the weaned calf. Health, condition, weight at time of sale, and the presence of horns are characteris-

**Table 3. Effects of Frame Size on Weaned Steer Prices, 300—599 Lbs. (1993 \$)**

Frame Size	1986/1987		1993	
	Percent of Pens (%)	Price Change (\$/cwt)	Percent of Pens (%)	Price Change (\$/cwt)
Large	12.5	Base	22.4	Base
Upper medium	62.0	0.79*	60.4	0.99*
Lower medium	23.9	-1.66*	16.2	-1.16*
Small	1.6	-11.30*	1.0	-10.03*

\*Indicates significantly different from zero at the .05 level.

**Table 4. Effects of Health on Weaned Steer Prices, 300—599 Lbs. (1993 \$)**

Health Condition	1986/1987		1993	
	Percent of Pens (%)	Price Change (\$/cwt)	Percent of Pens (%)	Price Change (\$/cwt)
Healthy	74.8	Base	86.1	Base
Dead hair or mud	18.5	-1.74*	8.8	-2.04*
Stale	2.8	-5.81*	2.8	-5.38*
Sick	0.9	-24.44*	0.8	-27.00*
Bad eye	1.8	-12.52*	0.6	-14.57*
Lame or lumps	1.1	-23.75*	0.9	-30.93*

\*Indicates significantly different from zero at the .05 level.

tics the producer may affect directly, without regard to the breeding program.

**Impact of health:** Light-weight feeder cattle marketed in unhealthy condition received the largest discounts identified by this study. Economically significant discounts were assessed to calves that were sick, had bad eyes, were lame, stale, or had lumps at the time of sale. Tables 4 and 12 detail the price discounts for health conditions for steers and heifers. These results clearly illustrate that feeder cattle buyers have little interest in purchasing unhealthy feeder calves. This is most likely attributable to higher death losses and poor feeding performance generally associated with unhealthy animals.

**Effect of condition on price:** Premiums and discounts for condition variables are reported for steers and heifers in tables 5 and 13, respectively. During 1993, steers in very thin condition received a discount of \$9.19 per hundredweight compared with cattle sold with average flesh,

while buyers discounted heifers in the same condition \$7.99 per hundredweight. Cattle recorded as “very thin” appeared emaciated at the time of sale. Feeder calves in this condition could pose a greater health risk during the post-weaning period than calves in average flesh. Similarly, fat light-weight feeder steers and heifers were discounted heavily. Feeder cattle buyers could have concerns about the future feeding performance of light-weight feeder cattle that are fat at a young age. Buyers generally preferred light-weight feeder cattle that sold in average flesh because of the reduced likelihood of health or feeding performance problems.

**Effect of weight:** Weight had a greater impact on light-weight feeder calf prices in 1993 than in 1986/1987. Figures 2 and 3 show the discounts attributable to additional weight increased over time for light-weight steers and heifers.

Differences in feeder cattle prices across weights depend on the relative profitability of backgrounding and finishing programs.

Fed cattle price, feeder cattle price, corn prices, interest rates, and feeding performance all impact cattle feeding profitability. Since feeder cattle and corn futures prices were explicitly accounted for in this study, the larger weight discounts observed in 1993 can be attributed to differing expectations about anticipated feeding performance, interest rates, and fed cattle prices at the time the finished animal was sold. The relationship of price to weight varies as corn and fed cattle prices change.

**Price effects of horns:** Tables 6 and 14 report the impact of horns on feeder cattle prices. The presence of horns affected light-weight feeder steer prices in 1993. If all animals in a sale lot were horned, calves in that lot received a \$1.39 (steers) or \$1.77 (heifers) per hundredweight discount. That discount most likely occurred because of the greater opportunity for injury among horned cattle fed in confinement and because horned cattle are more difficult to process and handle in cattle chutes.

**Table 5. Effects of Condition on Weaned Steer Prices, 300—599 Lbs. (1993 \$)**

Condition Characteristic	1986/1987		1993	
	Percent of Pens (%)	Price Change (\$/cwt)	Percent of Pens (%)	Price Change (\$/cwt)
Very thin	0.4	0.67	0.6	-9.19*
Thin	17.8	-0.33	23.9	-0.62
Average condition	73.9	Base	69.9	Base
Fleshy	7.9	-2.58*	5.4	-3.66*
Fat	0.02	-4.61*	0.01	-15.84*

\*Indicates significantly different from zero at the .05 level.

## Marketing Characteristics

After all mating decisions have been made and all herd management/nutrition plans have been carried out, cow-calf producers still have the opportunity to influence their calves' sale price. Lot size, degrees of fill, weight uniformity, and time of sale are all determinants of calf value. Marketing decisions made up

until the time of sale can influence the value of the calf crop.

**Effect of Lot Size:** Significant price increases were realized for larger groups of feeder steers sold in 1993. Highest prices were paid for light-weight steers in lot sizes of 35 to 50 head, whereas buyers preferred larger lot sizes for heifers. The optimal lot size for light-weight heifers ranged from 50 to 75 head. Figures 4 and 5 illustrate the price response to

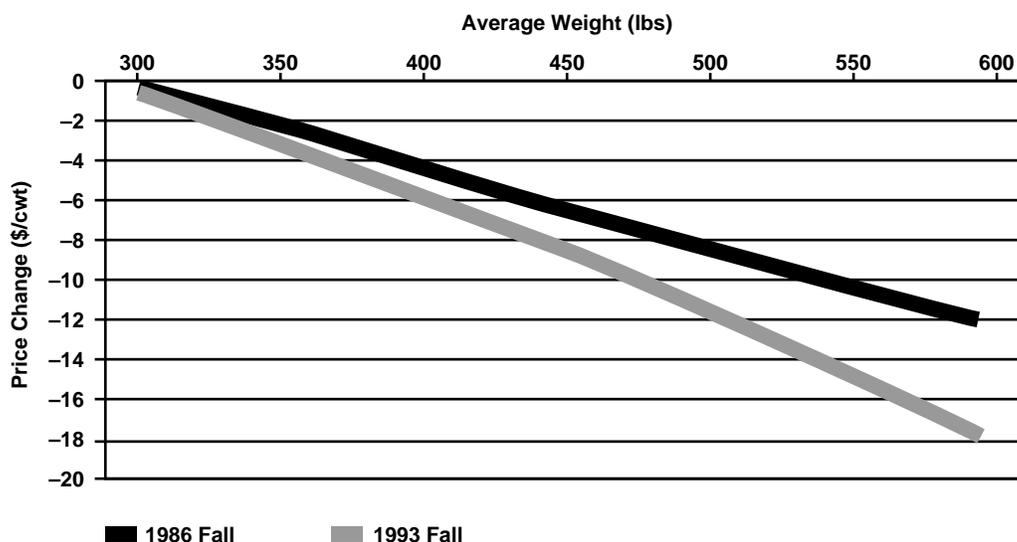
increasing lot size. Feeder cattle buyers prefer to purchase larger lot sizes of light-weight calves for three important reasons. First, the incidence of health problems may increase when buyers mix cattle from many different sources. Second, buyers find it more convenient to purchase truckload-size lots of uniform feeder cattle rather than buying several smaller groups of calves to make a truckload. Third, the

**Table 6.** Effects of Horns on Weaned Steer Prices, 300—599 Lbs. (1993 \$)

Characteristic	1986/1987		1993	
	Percent of Pens (%)	Price Change (\$/cwt)	Percent of Pens (%)	Price Change (\$/cwt)
No horns	81.8	Base	82.5	Base
Some horns	8.1	0.27	12.9	0.99*
All horns	10.1	-0.55	4.6	-1.39*

\* Indicates significantly different from zero at the .05 level.

**Figure 2.** Effect of Weight on 300-500 lb. Steer Prices in Fall



costs of trucking, sorting, and holding cattle at a central location until buyers can find enough cattle to make large, uniform groups increased from 1987/1987 to 1993, which is reflected in the larger lot size premiums in 1993.

**Price impact of fill:** Compared with steer calves that sold with average fill, shrunk light-weight feeder steers sold at a premium in

1993 (see tables 7 and 15). Typically, cattle sold in these degrees of fill are preferred because buyers expect rapid compensatory weight gains and good feed conversions from these cattle following their purchase. Conversely, light-weight feeder steers and heifers recorded as tanked (excessively full) received discounts greater than \$17 per

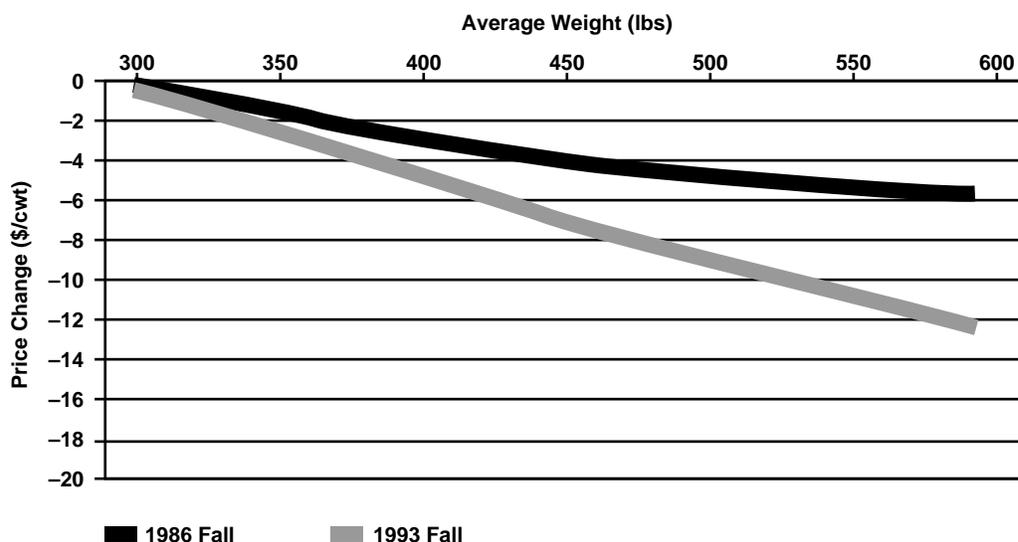
hundredweight in 1993 compared to calves selling with average fill. Buyers prefer not to buy cattle with a great deal of temporary water or forage weight in the gut. Fill is mostly a marketing decision because it can be affected greatly by restricting (or providing) access to water and forage a short time before a sale.

**Table 7. Effects of Fill on Weaned Steer Prices, 300—599 Lbs. (1993 \$)**

Fill Characteristic	1986/1987		1993	
	Percent of Pens (%)	Price Change (\$/cwt)	Percent of Pens (%)	Price Change (\$/cwt)
Gaunt	2.7	1.00	3.5	-0.40
Shrunk	24.4	0.81	30.1	0.78*
Average fill	63.7	Base	51.0	Base
Full	8.9	-4.79*	15.0	-2.45*
Tanked	0.3	-13.87*	0.4	-17.22*

\*Indicates significantly different from zero at the .05 level.

**Figure 3. Effect of Weight on 300-500 lb. Heifer Prices in Fall**



**Effect of weight uniformity:** Selling cattle of uniform weights has been speculated to have an influence on price. This study found that weight uniformity within lots did not significantly affect the sale prices of weaned calves in 1993.

**Impact of time of sale:** Time of sale was divided into four quarters: first (8:00 a.m. to noon),

second (12:01 p.m. to 4:00 p.m.), third (4:01 p.m. to 8:00 p.m.), and fourth (8:01 p.m. to end of sale). Premiums and discounts associated with time of sale are reported in Tables 8 and 16. In 1993, steers and heifers sold in the second quarter received premiums while those sold in the fourth quarter were discounted, both relative to light-weight calves marketed in the first

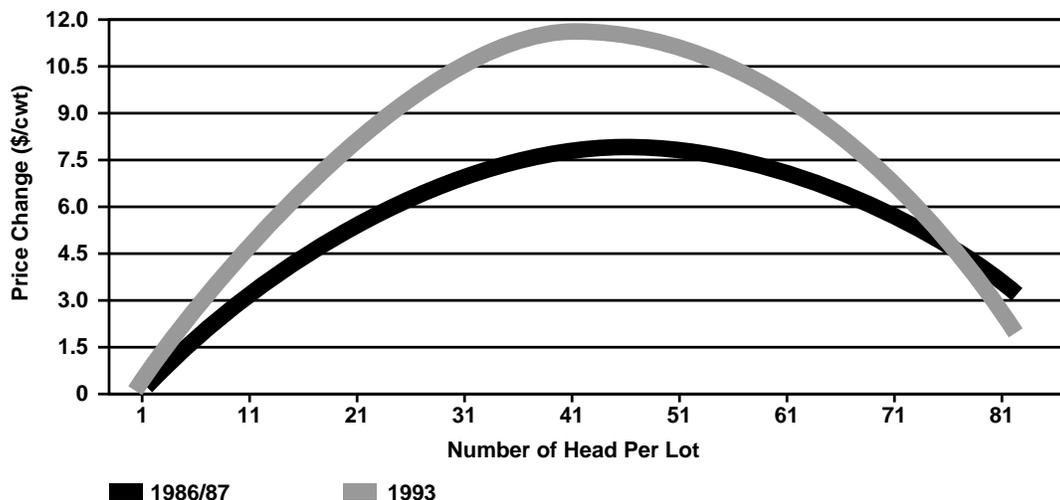
quarter of the sale. Changes in relative premiums based on time of sale could be attributable to changes in both buyer and seller behavior and the number of buyers present at different times of the sale. Cow-calf producers should work with their market operators regarding the best time to deliver cattle in relation to expected time of sale.

**Table 8. Effects of Time of Sale on Weaned Steer Prices, 300—599 Lbs. (1993 \$)**

Quarter of Sale	1986/1987		1993	
	Percent of Pens (%)	Price Change (\$/cwt)	Percent of Pens (%)	Price Change (\$/cwt)
Quarter 1	17.0	Base	16.6	Base
Quarter 2	57.6	3.13*	53.5	1.69*
Quarter 3	22.8	2.01*	27.9	-0.41
Quarter 4	2.6	1.43*	2.0	-1.96*

\*Indicates significantly different from zero at the .05 level.

**Figure 4. Lot Size Impact on 300-599 lb. Steer Prices**



## Conclusions

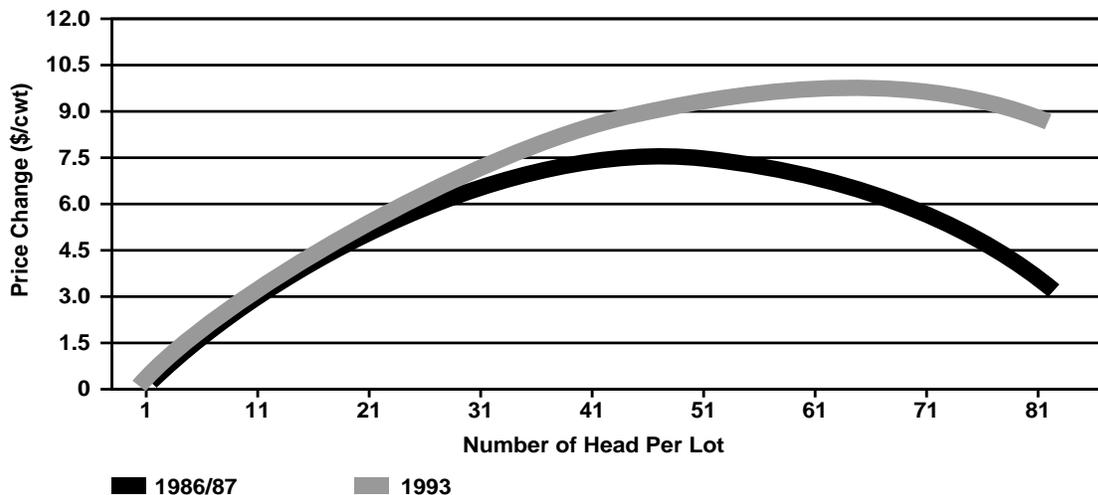
This study confirmed earlier Kansas State University research that indicated weight, lot size, health, condition, fill, muscling, frame size, breed, time of sale, and external market forces all significantly affected feeder cattle auction prices. When compared with 1986/1987 results, this study reveals that a structural change occurred in the Kansas feeder cattle market from 1986/1987 to 1993. Differences in premiums and discounts among breeds, increased discounts for many less-desirable traits (small frame size, light muscling), and greater pre-

miums for increased lot size were most notable among these changes. Consequently, users of this information should be cognizant that the price effects of various feeder cattle characteristics are likely to change in the future. This information is best used as part of the decision-making process, not as the sole criteria by which management practices and breeding animals are selected. With that admonition, cattle producers can use research results of this nature to alter genetic, management, and marketing practices that could lead to a more profitable cow-calf operation.

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Figure 5. Lot Size Impact on 300-599 lb. Heifer Prices



**Table 9. Effects of Breed on Weaned Heifer Prices, 300—599 Lbs. (1993 \$)**

<b>Breed</b>	<b>1986/1987</b>		<b>1993</b>	
	<b>Percent of Pens (%)</b>	<b>Price Change (\$/cwt)</b>	<b>Percent of Pens (%)</b>	<b>Price Change (\$/cwt)</b>
Hereford	14.2	Base	8.6	Base
Angus	12.7	-1.95*	10.0	1.53*
Hereford–Angus cross	28.8	0.79*	17.5	2.94*
Other English crosses	1.9	-0.63	1.9	1.53*
Exotic crosses	24.3	1.35*	44.9	3.26*
Brahman, 1/4 or less	4.6	-1.39*	5.1	0.89
Brahman, more than 1/4	1.8	-6.52*	0.6	-5.31*
Dairy	0.6	-9.52*	0.6	-10.59*
Longhorn	1.9	-7.96*	1.6	-6.98*
Mixed breeds	9.2	-0.48	9.2	1.32*

\*Indicates significantly different from zero at the .05 level.

**Table 10. Effects of Muscling on Weaned Heifer Prices, 300-599 Lbs. (1993 \$)**

<b>Muscling Characteristic</b>	<b>1986/1987</b>		<b>1993</b>	
	<b>Percent of Pens (%)</b>	<b>Price Change (\$/cwt)</b>	<b>Percent of Pens (%)</b>	<b>Price Change (\$/cwt)</b>
Heavy	98.3	Base	97.5	Base
Medium	1.6	-2.84*	2.4	-1.55
Light	0.1	-8.51*	0.1	-16.73*

\*Indicates significantly different from zero at the .05 level.

**Table 11. Effects of Frame Size on Weaned Heifer Prices, 300—599 Lbs. (1993 \$)**

Frame Size	1986/1987		1993	
	Percent of Pens (%)	Price Change (\$/cwt)	Percent of Pens (%)	Price Change (\$/cwt)
Large	8.8	Base	17.5	Base
Upper medium	64.2	-0.76*	61.0	0.18
Lower medium	25.4	-2.34*	19.9	-1.52*
Small	1.7	-12.17*	1.6	-9.78*

\*Indicates significantly different from zero at the .05 level.

**Table 12. Effects of Health on Weaned Heifer Prices, 300—599 Lbs. (1993 \$)**

Health Condition	1986/1987		1993	
	Percent of Pens (%)	Price Change (\$/cwt)	Percent of Pens (%)	Price Change (\$/cwt)
Healthy	76.9	Base	88.1	Base
Dead hair or mud	17.5	-1.81*	7.2	-1.66*
Stale	2.4	-6.74*	2.8	-4.57*
Sick	0.7	-26.40*	0.6	-17.83*
Bad eye	1.6	-10.79*	0.5	-7.83*
Lame or lumps	0.9	-19.57*	0.8	-25.86*

\*Indicates significantly different from zero at the .05 level.

**Table 13. Effects of Condition on Weaned Heifer Prices, 300—599 Lbs. (1993 \$)**

Fill Characteristic	1986/1987		1993	
	Percent of Pens (%)	Price Change (\$/cwt)	Percent of Pens (%)	Price Change (\$/cwt)
Very thin	0.4	-3.36	1.0	-7.99*
Thin	17.6	-0.85*	24.7	-0.20
Average condition	72.5	Base	66.4	Base
Fleshy	9.5	-1.21	7.9	-3.54*
Fat	0.05	3.07*	0.03	-13.38*

\* Indicates significantly different from zero at the .05 level.

**Table 14. Effects of Horns on Weaned Heifer Prices, 300—599 Lbs. (1993 \$)**

<b>Characteristic</b>	<b>1986/1987</b>		<b>1993</b>	
	<b>Percent of Pens (%)</b>	<b>Price Change (\$/cwt)</b>	<b>Percent of Pens (%)</b>	<b>Price Change (\$/cwt)</b>
No horns	84.5	Base	82.6	Base
Some horns	7.5	0.55*	13.0	0.78*
All horns	8.0	-0.48	4.4	-1.77*

\*Indicates significantly different from zero at the .05 level.

**Table 15. Effects of Fill on Weaned Heifer Prices, 300—599 Lbs. (1993 \$)**

<b>Fill Characteristic</b>	<b>1986/1987</b>		<b>1993</b>	
	<b>Percent of Pens (%)</b>	<b>Price Change (\$/cwt)</b>	<b>Percent of Pens (%)</b>	<b>Price Change (\$/cwt)</b>
Gaunt	2.3	1.97*	3.1	0.43
Shrunk	25.6	1.79*	30.9	0.51
Average fill	64.5	Base	52.9	Base
Full	7.2	-4.40*	12.7	-2.23*
Tanked	0.4	-15.85*	0.4	-19.43*

\*Indicates significantly different from zero at the .05 level.

**Table 16. Effects of Time of Sale on Weaned Heifer Prices, 300—599 Lbs. (1993 \$)**

<b>Quarter of Sale</b>	<b>1986/1987</b>		<b>1993</b>	
	<b>Percent of Pens (%)</b>	<b>Price Change (\$/cwt)</b>	<b>Percent of Pens (%)</b>	<b>Price Change (\$/cwt)</b>
Quarter 1	17.1	Base	14.9	Base
Quarter 2	59.6	1.81*	54.4	1.24*
Quarter 3	20.4	1.09*	29.0	-0.45
Quarter 4	2.9	1.04*	1.7	-1.54*

\*Indicates significantly different from zero at the .05 level.

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Readers interested in information about the effect of selected characteristics on heavyweight feeder cattle are referred to *Buying and Selling Feeder Cattle: The Impact of Selected Characteristics on Feeder Cattle Prices*. MF-2162, Cooperative Extension Service, Kansas State University, January 1996.



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