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Feeder cattle price differentials: how much did they change over time?

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**FEEDER CATTLE PRICE DIFFERENTIALS:
HOW MUCH DID THEY CHANGE OVER TIME? ¹**

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Summary

Results from mathematical models of feeder cattle price/characteristics using data collected in Kansas and Missouri in 1986/1987 and from 1993 using the same data collection and modeling procedures indicate that the implicit values of many feeder cattle characteristics changed over time. Characteristic values often changed whether their value was measured in dollars per hundredweight or as a percentage of the mean feeder price during the data collection period. Directional impacts of characteristics on feeder cattle price were generally consistent from 1986/1987 to 1993. These results imply that, as market conditions change, new feeder cattle price/characteristic relationships need to be estimated.

(Key Words: Feeder Cattle, Prices, Physical Characteristics.)

Introduction

Prices paid for lots of feeder cattle vary because of changing market conditions and also because of differences in their physical characteristics. Price differences associated with changes in various physical characteristics are referred to as implicit values of those characteristics. This study examined whether implicit values of feeder cattle characteristics vary over time, when the characteristics are measured and modeled in the same manner for the same geographical area. Previously, it has been difficult to determine whether changes in

feeder cattle characteristic values across studies were attributable to structural changes in demand for feeder cattle characteristics, differences in data collection and modeling procedures, or geographical differences. Many feeder cattle buyers and sellers use publicly available research results on characteristic values to improve their management and marketing decisions. If characteristic values change appreciably over time, estimates should be updated periodically and cattle market participants should be wary of relying on dated characteristic-value information.

Experimental Procedures

To test whether feeder-cattle 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 and at seven Kansas auctions and one Missouri auction in 1993. Evaluators for both data collection periods received the same training. 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 again from November 1 through December 11 with November 22-27 omitted because of the Thanksgiving holiday. Evaluators recorded price per hundredweight for each lot, and individual lots of cattle were evaluated with respect to nine animal characteristics (breed,

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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, and feeder-cattle futures price. The settlement price for nearby feeder-cattle futures contract from the day prior to the sale was recorded for cattle sold before 1 p.m., and the current day's closing price was recorded for cattle sold after 1 p.m.

The data set consisted of information collected on 38,788 lots of steers and heifers weighing between 300 and 899 lb for a total of 362,858 head. Forty-four percent of the lots were sold in 1986/1987 and 56 percent were marketed during 1993. Cattle prices were substantially higher during 1993 than in 1986/1987. For example, the mean price for a 700-799 lb steer in the 1993 data was \$81.35 per hundredweight compared to a mean price in the 1986/1987 data of \$63.46 per hundredweight, a 28% price increase for that weight class. Fifty-five percent of the cattle were steers and 45% were heifers in 1986/1987 compared to 54% steers and 46% heifers in 1993. During 1986/1987, 58% of the cattle were sold in the fall and 42% in the spring, whereas 49% of the cattle were sold in the fall and 51% in the spring during 1993.

Demand for a lot of feeder cattle will be affected by each lot's physical traits. Therefore, feeder-cattle price was modeled as a function of the physical characteristics possessed by the particular lot and the fundamental market forces reflecting feeder-cattle supply and demand changes over the observed time period. Feeder-cattle futures prices were used to capture the effect of changes in fundamental market forces. Separate models were estimated for steers weighing 300-599 lb, steers weighing 600-899 lb, heifers weighing 300-599 lb and heifers weighing 600-899 lb.

Results and Discussion

Selected results from the four steer models are reported in Table 1. Heifer models are not reported to conserve space, so the discussion will focus primarily on the steer models results. All parameter estimates represent price changes from a reference lot of uniform, heavily muscled, Hereford steers in good health, average condition and fill, without horns, and sold during the first quarter of the sale at auction market 1. The steer and heifer models explained 59 to 74% of the variation in feeder-cattle prices. Statistical test indicated that the feeder-cattle price/characteristics relationship did change from 1986/1987 to 1993, but that the degree of change varied by characteristic.

The impact of lot size was more pronounced in 1993 than in 1986/1987 (Figure 1). During 1986/1987, heavyweight steers received the highest lot-size premium when sold in lots ranging from 60 to 70 head. In 1993, buyers preferred cattle sold in slightly larger lots as the highest lot-size premium occurred for lots of 65 to 75 head. More importantly, the price premium associated with each lot size was larger in 1993 than in the previous time period. For example, at a lot size of 65 head, the lot-size premium for heavyweight steers was \$6.37 per hundredweight in 1993 compared to \$4.16 in 1986/1987.

Lot-size premiums for lightweight steers increased more markedly from 1986/87 to 1993 than those for heavyweight steers (Figure 2). During both time periods, lot sizes of 40 to 50 head received the highest lot-size premiums, with the highest occurring at 43 head in 1993 vs. 46 head in 1986/1987. At a lot size of 45 head, the maximum lot-size premium for steers weighing 300-599 lb in 1993 was \$11.52 vs. \$6.27 in 1986/1987. These results indicate that buyers still prefer to buy lighter-weight cattle in smaller lot sizes than heavyweight cattle and that they were willing to pay much larger premiums

in 1993 than in 1986/1987 to buy cattle in truckload lots.

Feeder-cattle buyers prefer heavy-muscling cattle. Consequently, light- and medium-muscling cattle were discounted compared to heavy-muscling cattle. The discounts for medium muscling changed little over the 6 years between samples, but the discount for light-muscling animals increased sharply for both lightweight and heavyweight steers measured in both dollars per hundredweight and as a percentage of the average price. For example, the percentage discount for heavy weight light-muscling steers increased from 7% in 1986/1987 to 19% in 1993. This shift in discounts could be indicative of increasing concern by feeder-cattle buyers about carcass quality.

Feeder-cattle buyers tend to prefer cattle classified in the upper medium or large frame categories. Steers in the lower medium category in both weight classes received discounts compared to large framed steers, but the discounts were smaller in 1993 than in 1986/1987. Lightweight, small-framed feeder steers were discounted between \$9 and \$10 per hundredweight in both time periods, but the discount for heavyweight small-framed feeder steers more than doubled from 1986/1987 to 1993. This shift in discounts could indicate that feeder-cattle buyers became more concerned about purchasing feeder cattle that will produce carcasses desired by packers and that will perform well when placed on a finishing ration.

Table 1. Estimated Premiums and Discounts^a Associated with Feeder Steer Characteristics, Fall 1986/Spring 1987 and 1993^b

Characteristics	1986-1987 Steers 300 - 599 lb	1993 Steers 300 - 599 lb	1986-1987 Steers 600 - 899 lb	1993 Steers 600 - 899 lb
	----- (\$CWT) -----			
Muscling				
Heavy muscling (base)	0	0	0	0
Medium muscling	-4.34**	-5.05**	-3.36**	-3.46**
Light muscling	-14.56**	-20.61**	-4.28*	-15.46**
Frame Size				
Large frame (base)	0	0	0	0
Medium upper 1/2	.60*	.95**	-.073	.08
Medium lower 1/2	-1.46**	-1.09*	-1.80**	-1.13**
Small	-9.11**	-9.88**	-4.17**	-8.90**
Adjusted R-squared	.71	.60	.74	.59
Observations	5306	6291	4071	5475
Dependent variable mean	\$68.33	\$92.15	\$63.47	\$81.85

*Different from zero (P<.05).

** Different from zero (P<.01).

^aAll premiums and discounts are relative to the reference lot of heavily muscling Hereford steers in healthy condition, average fill and condition, large frame size, without horns, in a uniform lot, and sold during the first quarter of the sale at market 1.

^bThe seven markets from which data were collected in 1986/1987 were Dodge City, Fort Scott, Manhattan, Parsons, Pratt, Russell and Salina, Kansas. The eight markets from which data were collected in 1993 were Dodge City, Junction City, Manhattan, Oakley, Parsons, Pratt and Wakeney, Kansas, in addition to Joplin, Missouri.

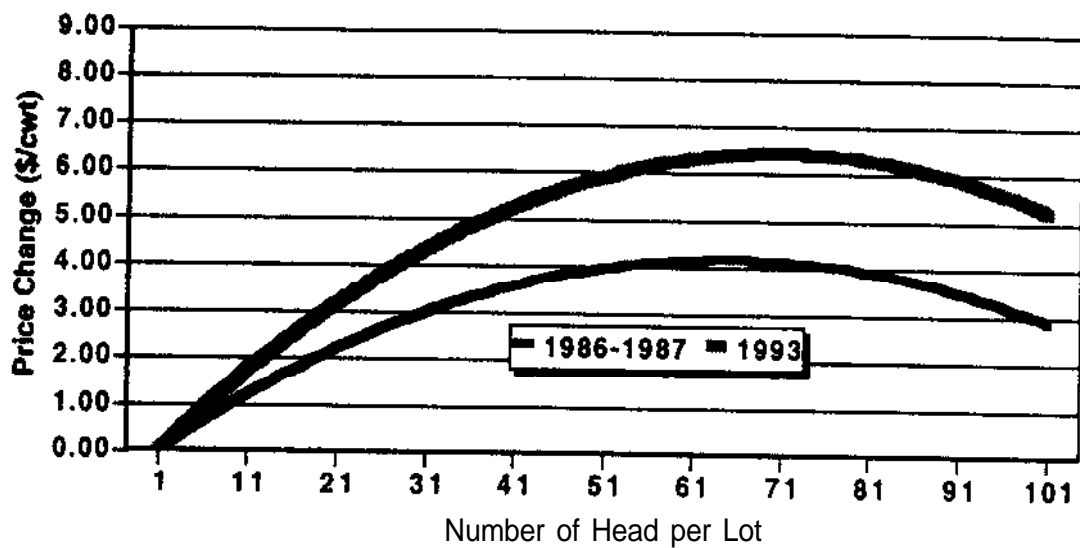


Figure 1. Lot Size Impact on Prices for 600- to 899-lb Steers

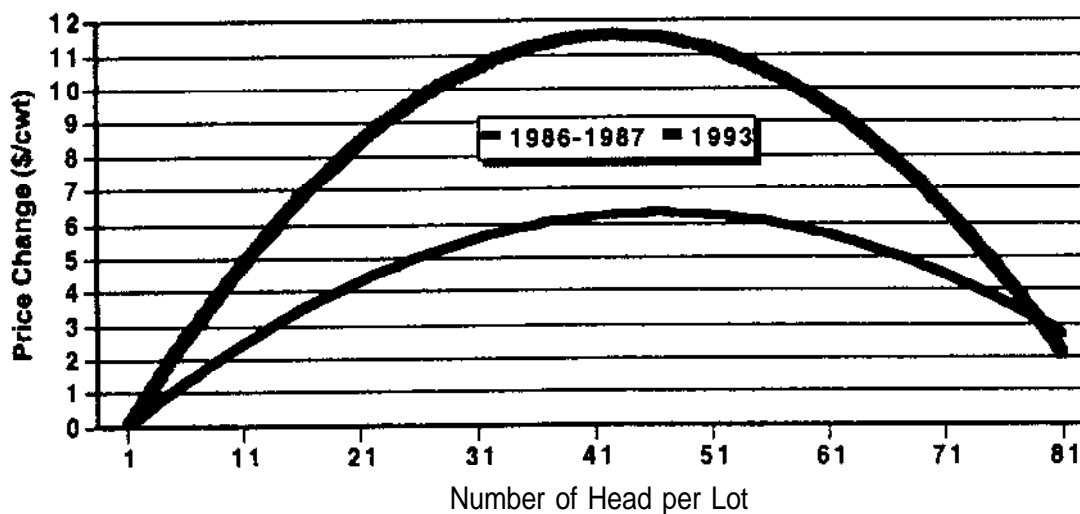


Figure 2. Lot Size Impact on Prices for 300-to 599-lb, Steers