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IMPACTS OF CORN AND FED-CATTLE PRICES ON PRICE SLIDES FOR FEEDER CATTLE

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Summary

Several important determinants need to be considered when analyzing price slides (price-weight relationships) for feeder cattle. The two most economically important determinants of price-weight slides are expected fed-cattle price and corn price. Price-weight slides increase notably when corn prices decline (i.e., the premium for light-weight calves increases as feed prices decrease). Likewise, when expected fed-cattle prices increase, price-weight slides increase. Knowing this information can help producers who forward contract feeder cattle, backgrounders making decisions regarding feeding calves to various weights, and producers making feeder cattle purchase decisions.

(Key Words: Price Slides, Feeder Cattle Prices, Price Determinants.)

Introduction

Price determination and discovery for feeder cattle are complex, because many factors impact feeder cattle markets. Feeder cattle are inputs into a production process; therefore, feeder cattle demand is affected by all factors that affect future anticipated demand for fed cattle as well as expected cattle backgrounding and(or) feeding costs. Also, as feeder cattle weight varies, the relative importance of expected selling price and expected input costs changes. Thus, determinants of feeder cattle demand vary in importance over time as the cattle grow. A formidable task facing potential cattle buyers and sellers is how market prices are likely to change as the form of the product

(i.e., cattle weight) and expected input and output prices change.

Our objective was to quantify how feeder cattle price changes as cattle weight, expected input costs, and expected selling prices change, and how these factors change in relative importance as feeder cattle weight varies. Results of this study are useful to cattle producers when making management decisions concerning alternative production strategies (e.g., creep feeding calves, rate of gain to pursue in backgrounding programs, length of grazing season) and timing of buy/sell decisions. Understanding how market conditions affect price slides (price-weight relationships) will allow producers to incorporate weight adjustments into price forecasts.

Experimental Procedures

Sale price, weight, number of head in sale lot, sex, and breed information were collected on individual sale lots of feeder cattle from the Winter Livestock Auction in Dodge City, Kansas from January 1987 through December 1996. The data included 46,123 individual lots with average weights of 300 to 900 lb representing five breed categories (English, mixed, Continental/ European, Longhorn, and Holstein). Slightly over half (55.5%) of the lots were steers, and the rest were heifers.

¹Department of Agricultural Economics. supplying data necessary to complete this study.

Appreciation is expressed to Marvin Fausett for

In addition to the information on each individual lot of feeder cattle, weekly average futures prices for fed cattle and corn were collected to be used as proxies for expected fed-cattle price and expected corn price.

Summary statistics for feeder-cattle price and weight variables are given in Table 1. Average weight was 660 lb. Price averaged \$80.64/cwt over the 10-year time period and ranged from a low of \$40.10 to a high of \$142.50 across weights and time. Weekly average corn price was \$2.60/bu. (range, \$1.52 to \$4.38), and weekly average cattle futures price was \$69.79/cwt (range, \$54.25 to \$78.00).

To quantify the price-weight relationship for feeder cattle while accounting for the major price determinants, feeder cattle price was regressed on weight, sex, live-cattle futures price, and corn futures price. Weight squared also was included to allow for nonlinear impacts of weight. Interaction terms between weight and each other variable were included.

Models including variables for breed, seasonality, profitability, and price variability also were estimated. Results with regards to the variables of interest here (fed cattle and corn prices) were similar, so the simpler model is presented to save space.

Results and Discussion

Regression results are reported in Table 2. The model explained 88.7% of the variability in feeder cattle prices. Every coefficient is statistically different from zero ($P < .05$), which is expected given the large number of observations. Because of the interaction and squared terms, the effects of

each variable are difficult to decipher simply by examining the coefficients. Therefore, to enhance interpretation, graphical analysis is used to demonstrate the impacts of various price determinants.

Figure 1 shows the price-weight slide for feeder cattle as corn price varies from the mean of \$2.60/bushel plus and minus two standard deviations and fed-cattle futures price is held steady at its mean. For lower corn prices, feeder cattle price increases more rapidly as feeder cattle weight decreases. This is as expected; when corn price is lower, lightweight feeder cattle are worth more relative to heavy-weight cattle because cost of gain is low. For example, the price spread between 500 and 800 lb steers is almost \$20/cwt when corn price is \$1.68/bu but declines to just slightly over \$8/cwt with a \$3.52/bu corn price. An important implication is that price-weight slides should be adjusted for different corn prices.

Expected fed-cattle price also has a sizeable impact on the price-weight relationship (Figure 2). When the corn futures price is held at its mean, the price spread between 500 and 800 lb steers is about \$19/cwt with a fed-cattle futures price (mean price plus a two standard deviations) of \$79.37/cwt, whereas the spread is approximately \$9/cwt with a fed-cattle futures price of \$60.21/cwt (mean less two standard deviations). Price-weight slides clearly depend on both expected fed-cattle prices and corn prices.

Results here indicate that the relationship between feeder cattle prices and feeder cattle weights (i.e., price slides) vary as feed and fed cattle prices vary. Thus, it is important to account for current market conditions when estimating the impact that weight has on feeder cattle price.

Table 1. Summary Statistics of Feeder Cattle Sale Data and Futures Prices, January 1987 - December 1996 (46,123 head)

Variable	Mean	Std Dev	Minimum	Maximum
Price (\$/cwt)	80.64	12.83	40.10	142.50
Weight (lbs.)	660	141	300	900
Corn futures price ^a (\$/bu.)	2.60	0.46	1.52	4.38
Live cattle futures price ^a (\$/cwt)	69.79	4.79	54.25	78.00

^aAverage of third, fourth, and fifth contracts out where the nearby contract is the first contract out.

Table 2. Regression Results (dependent variable is feeder cattle price, \$/cwt)

Variable	Parameter Estimate	Standard Error	P-Value
Intercept	-45.5491	5.9043	0.0001
Live cattle futures (LC)	3.9149	0.0795	0.0001
Corn futures (CN)	-36.5803	0.9003	0.0001
Weight	0.0661	0.0199	0.0009
Weight squared	-3.8×10^{-5}	1.6×10^{-5}	0.0205
Heifer $\times$ weight	-0.0410	0.0004	0.0001
Heifer $\times$ weight squared	4.7×10^{-5}	5.6×10^{-7}	0.0001
LC $\times$ weight	-0.0048	0.0003	0.0001
LC $\times$ weight squared	2.4×10^{-6}	2.1×10^{-7}	0.0001
CN $\times$ weight	0.0621	0.0029	0.0001
CN $\times$ weight squared	-3.2×10^{-5}	2.3×10^{-6}	0.0001
R ²	88.7		

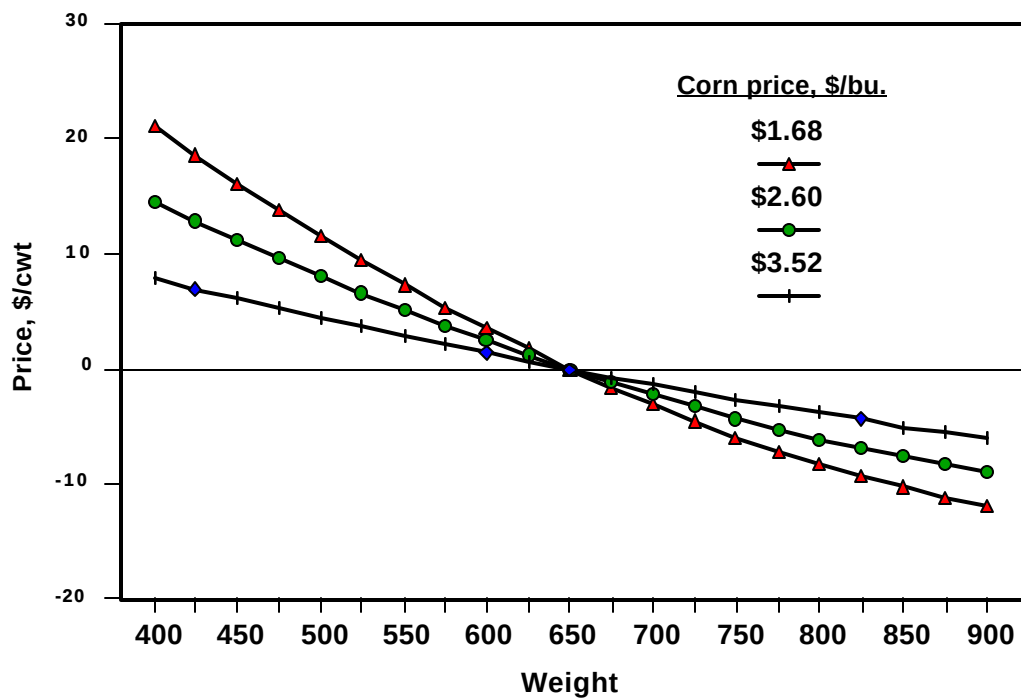


Figure 1. Impact of Corn Price on Feeder-Cattle Price Slide.

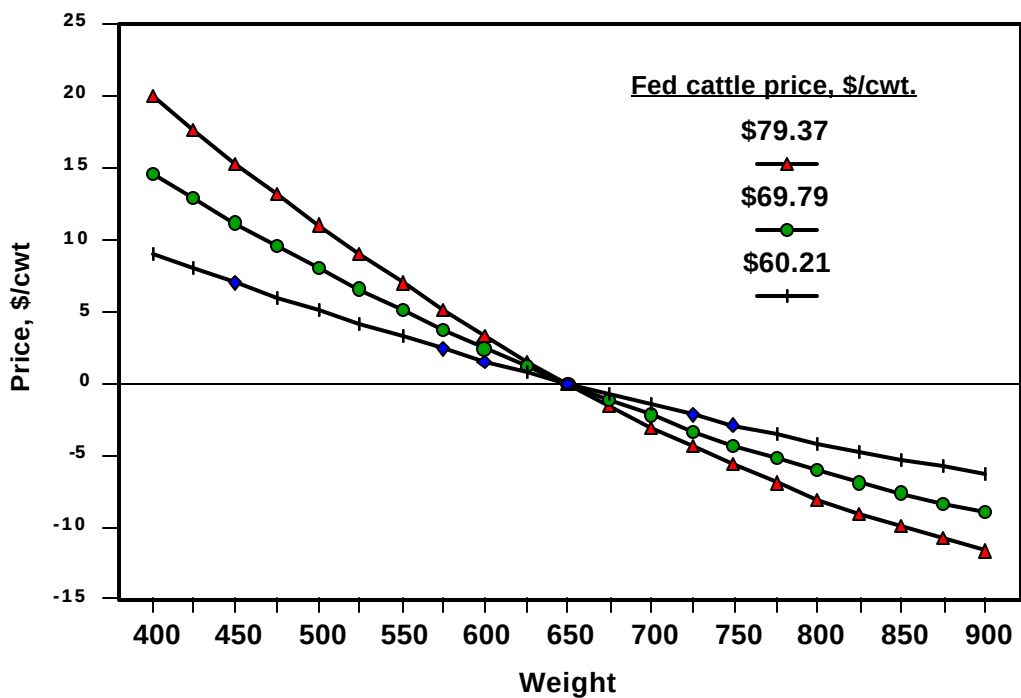


Figure 2. Impact of Fed-Cattle Price on Feeder-Cattle Price Slide.