Impacts of corn and fed-cattle prices on price slides for feeder cattle

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Abstract
Several important determinants need to be considered when analyzing price slides (priceweight 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.

Keywords
Cattlemen's Day, 2000; Kansas Agricultural Experiment Station contribution; no. 00-287-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 850; Beef; Price slides; Feeder cattle prices; Price determinants

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

K. C. Dhuyvetter¹ and T.C. Schroeder¹

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 
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pected fed-cattle prices increase, price-weight 
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ducers 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 ex-
pected 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 impor-
tance 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. Un-
derstanding 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, Kan-
sas from January 1987 through December 
1996. The data included 46,123 individual lots 
with average weights of 300 to 900 lb repre-
senting five breed categories (English, mixed, 
Continental/ European, Longhorn, and Hol-
stein). Slightly over half (55.5%) of the lots 
were steers, and the rest were heifers.

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Appreciation is expressed to Marvin Fausett for 
supplying data necessary to complete this study.
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 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. 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)

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

\(^a\)Average 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)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter Estimate</th>
<th>Standard Error</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-45.5491</td>
<td>5.9043</td>
<td>0.0001</td>
</tr>
<tr>
<td>Live cattle futures (LC)</td>
<td>3.9149</td>
<td>0.0795</td>
<td>0.0001</td>
</tr>
<tr>
<td>Corn futures (CN)</td>
<td>-36.5803</td>
<td>0.9003</td>
<td>0.0001</td>
</tr>
<tr>
<td>Weight</td>
<td>0.0661</td>
<td>0.0199</td>
<td>0.0009</td>
</tr>
<tr>
<td>Weight squared</td>
<td>-3.8 x 10(^{-5})</td>
<td>1.6 x 10(^{-5})</td>
<td>0.0205</td>
</tr>
<tr>
<td>Heifer × weight</td>
<td>-0.0410</td>
<td>0.0004</td>
<td>0.0001</td>
</tr>
<tr>
<td>Heifer × weight squared</td>
<td>4.7 x 10(^{-5})</td>
<td>5.6 x 10(^{-7})</td>
<td>0.0001</td>
</tr>
<tr>
<td>LC × weight</td>
<td>-0.0048</td>
<td>0.0003</td>
<td>0.0001</td>
</tr>
<tr>
<td>LC × weight squared</td>
<td>2.4 x 10(^{-6})</td>
<td>2.1 x 10(^{-7})</td>
<td>0.0001</td>
</tr>
<tr>
<td>CN × weight</td>
<td>0.0621</td>
<td>0.0029</td>
<td>0.0001</td>
</tr>
<tr>
<td>CN × weight squared</td>
<td>-3.2 x 10(^{-5})</td>
<td>2.3 x 10(^{-6})</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

\(R^2\) 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.