



Steer-Heifer Feeder Cattle Basis by Weight Groups

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Feeder cattle production is a risky enterprise. Producers typically produce one calf crop per year (spring or fall). As a result, marketing of stocker calves or feeder cattle are typically limited to a relatively short time period each year. Producers have virtually no control over market prices when they market their calves or feeder cattle. Hedging, both with futures market contracts and with options on futures market contracts, is a potentially useful form of price risk management for cattle producers. One key to effective hedging is understanding basis. That entails understanding basis patterns and behavior as well as factors affecting feeder cattle basis.

This fact sheet provides information on feeder cattle basis and identifies variables that explain changes in feeder cattle basis. These factors differ somewhat for steers and heifers and for feeder cattle of varying weights. (For historical basis tables, see Current Report, CR-542, *Feeder and Fed Cattle Basis Tables*.)

Background

The extent to which cattle producers use feeder cattle futures markets to hedge feeder cattle prices is unknown. However, one key element to effectively using any futures market for hedging is understanding basis. Price et al. stressed that basis must be predictable to be useful for hedging. A step toward predicting basis is being able to explain basis and the factors that affect it.

Feeder cattle basis is the difference between the local cash price for feeder cattle and the nearby feeder cattle futures market contract price. Basis incorporates differences in time, quality, location, and marketing method. Cattle producers do not necessarily produce feeder cattle that meet the futures contract specifications of the Chicago Mercantile Exchange (CME). The feeder cattle futures contract specifies 50,000 lbs. of 700-849 lb., medium #1 and medium-large #1 steers. Nevertheless, the feeder cattle contract is used to hedge all classes of feeder cattle, from 400 to 900 pounds and both steers and heifers. Different market forces drive the price of feeder cattle and, in particular, the price of different quality feeder cattle. The quality differences of particular interest in this publication are differences between steers and heifers and between weights of feeder cattle.

More research has been done on live cattle basis than feeder cattle basis. Live cattle basis research indicates the

importance of supply and demand factors for fed cattle in explaining changes in live cattle basis. Therefore, it can be presumed that similar supply and demand factors affect feeder cattle basis. One study has focused on forecasting feeder cattle basis, but not necessarily identifying all the factors that affect feeder cattle basis (Eilrich). However, he found that one demand factor (live cattle futures market price) and one supply factor (corn price) along with seasonal variables were important to forecasting feeder cattle basis. In actuality, several other economic factors influence feeder cattle basis.

Explaining Basis Terminology

Basis can be positive (cash prices above futures market prices) or negative (cash prices below futures market prices). Frequently, analysts and producers use terms like stronger basis and weaker basis. Since basis is the difference between two prices (cash and futures), several combinations of changes in the underlying prices can affect changes in basis. Basis is typically positive for feeder cattle, though there are exceptions as will be noted. For a positive basis, the several ways that feeder cattle basis can be strengthened or weakened are:

Basis is stronger if ...

- Cash prices increase and futures market prices remain unchanged
- Cash prices remain unchanged and futures market prices decline
- Cash prices increase and futures market prices decrease
- Cash prices increase more than futures market prices increase
- Cash prices decrease less than futures market prices decrease

Basis weakens if ...

- Cash prices decrease and futures market prices remain unchanged
- Cash prices remain unchanged and futures market prices increase
- Cash prices decrease and futures market prices increase
- Cash prices decrease more than futures market prices decrease
- Cash prices increase less than futures market prices increase.

Basis Summary Statistics

The Livestock Marketing Information Center (LMIC) maintains weekly data on U.S. Department of Agriculture (USDA) feeder cattle prices at Oklahoma City and weekly data on Chicago Mercantile Exchange (CME) feeder cattle futures market prices. The calculated weekly average feeder cattle futures market price is an average of the daily prices for the nearby feeder cattle futures market contract for that particular week. The data period for information reported here was from January 1992 through May 2001. Basis was calculated for steers and heifers weighing between 400 and 800 lbs. in 50-pound increments. Thus, 16 different basis groups were examined.

Summary statistics for each are shown in Table 1. Summary statistics indicate important characteristics of feeder cattle basis. Basis differs markedly between steers and heifers and as weight changes. It can be noted that feeder cattle basis is larger and more variable for feeder cattle the farther away weight is from the contract specifications. Thus, there is more variability in basis for lighter weights of feeder cattle than for heavier weights.

Figure 1 shows the average steer and heifer basis for each weight group. Basis for steers is greater than for heifers for all weight groups. This parallels prices for feeder cattle in that steer prices are typically higher than heifer prices. Basis becomes smaller as weight increases. Basis is larger in an absolute sense for higher priced feeder cattle, i.e., lighter weights.

Figures 2 and 3 show the average basis for steers and heifers along with an indication of the variability of basis by weight group. The lines above and below the average basis line for each weight represent one standard deviation plus and minus the average. Thus, two-thirds of the time for the

data period, basis was between the upper and lower range for each weight group. However, for one-third of the time, basis was more than one standard deviation above or below the average. Note that as weight increases, not only does basis decline, but so does the standard deviation. This can be seen both in Table 1 and in Figures 2 and 3.

There is more seasonality in some of the weight series than others. Figure 4 shows the average monthly basis for two weight groups of steers. Basis is clearly stronger (wider) for 400-450 pound calves in the spring months, then narrows during the summer and fall before increasing at the end of the year. Monthly average basis ranges from a low of \$15.25/cwt. in October to a high of \$26.97 in March. Much less seasonality is evident in 750-800 pound steers. Average monthly basis ranges from a low of -\$0.47/cwt. in September to a high of \$1.98 in December.

Factors Affecting Basis

A model was estimated to explain the variation in feeder cattle basis at Oklahoma City for steers and heifers and for each of the eight weight groups. The models were not intended to forecast basis three to six months in advance, as would be needed for a hedging program. Regression results indicate the explanatory variables used in these models explained more of the variation for lighter weight cattle than for cattle that more closely approximated the contract specifications. Changes in weekly average basis were expected to be caused by changes in demand and supply conditions. Factors expected to affect basis were the previous week's basis, the nearby live cattle futures market price, current week's beef production, current month's retail pork and broiler prices, current week's corn and wheat prices, current monthly cattle on feed and feedlot placements, and seasonality.

Table 1. Feeder Cattle Basis Summary Statistics, January 1992 to May 2001.

Variable	Unit	Mean	Standard Deviation	Minimum	Maximum
400-450 Steer Basis	\$/cwt.	20.14	8.07	-3.79	38.99
450-500 Steer Basis	\$/cwt.	15.81	7.17	-6.29	33.72
500-550 Steer Basis	\$/cwt.	11.70	6.17	-3.96	27.97
550-600 Steer Basis	\$/cwt.	8.36	5.20	-4.17	23.51
600-650 Steer Basis	\$/cwt.	5.46	3.95	-3.71	18.28
650-700 Steer Basis	\$/cwt.	3.29	2.62	-4.04	11.34
700-750 Steer Basis	\$/cwt.	1.72	1.58	-2.29	7.63
750-800 Steer Basis	\$/cwt.	0.26	1.51	-4.84	5.01
400-450 Heifer Basis	\$/cwt.	6.44	7.24	-12.36	26.43
450-500 Heifer Basis	\$/cwt.	3.99	6.39	-12.16	20.40
500-550 Heifer Basis	\$/cwt.	1.97	5.37	-11.08	17.71
550-600 Heifer Basis	\$/cwt.	0.15	4.41	-11.21	12.39
600-650 Heifer Basis	\$/cwt.	-1.32	2.92	-10.42	6.43
650-700 Heifer Basis	\$/cwt.	-2.52	1.97	-8.87	4.33
700-750 Heifer Basis	\$/cwt.	-3.54	1.73	-9.20	1.54
750-800 Heifer Basis	\$/cwt.	-4.90	2.02	-10.75	0.39

Figure 1. Average Steer and Heifer Basis, by Weight Group

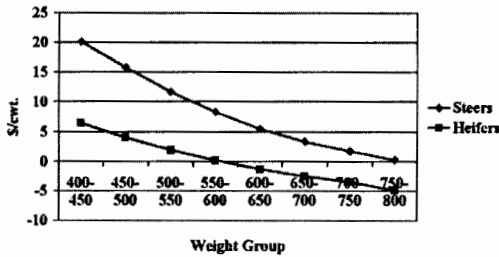


Figure 2. Average Steer Basis Plus/Minus One Standard Deviation, by Weight Group

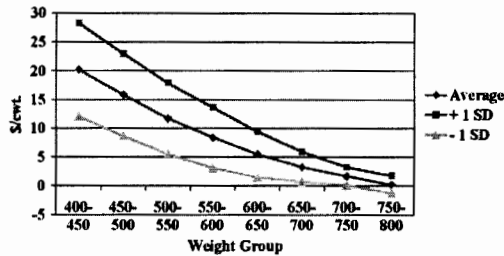


Figure 3. Average Heifer Basis Plus/Minus One Standard Deviation, by Weight Group

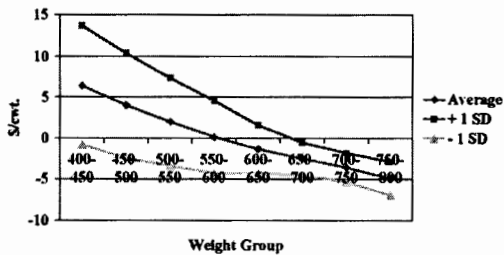
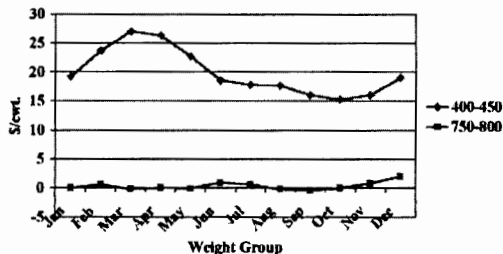


Figure 4. Seasonal Difference in Steer Basis for Two Weight Groups



The best estimate of the current week basis was the past week's basis. Other factors represented changes in demand (nearly live cattle futures market price, U.S. production of beef and retail price of competing meats) and changes in supply (Texas cash corn and wheat prices, and 7-state cattle on feed and feedlot placements). It was expected that the importance of certain variables would differ for different weights and sex of feeder cattle. The monthly dummy variables were used to explain net seasonal basis patterns.

As expected, regression coefficients and their importance varied according to the weight and sex of feeder cattle. Positive coefficients indicated that basis strengthened when the explanatory variable increased; and conversely, basis weakened when the explanatory variable decreased.

The lagged basis variable was positive and significant for all models, both for steers and heifers and for all weights. Thus, as expected, the best estimate of the current week's basis was the previous week's basis. The live cattle futures market price was significant for most of the heavier weights of steers (over 600 pounds) and for all heifer models. As the expected price of fed cattle increases, basis strengthens. Beef production was positive and significant for most steer and heifer weight groups. Increases in current beef production strengthened the basis for feeder cattle. Retail pork and poultry prices were important for some regression models, but were not always consistent.

Variables affecting supply changes were important, but also not always consistent. In general, corn and wheat price increases caused a weakening of the basis. Wheat prices were more important in explaining feeder cattle basis for lighter weights of steers and heifers than corn prices. Corn prices were important, but less consistent. These results may be related to the important role wheat pasture availability plays in the stocker program for smaller feeder (stocker) cattle in Oklahoma. Cattle-on-feed effects also were not consistent across weight groups. Feeder cattle placements had a negative relationship with feeder cattle basis as expected and were quite consistent both for lighter weight steers and heifers. As the available supply of feeder cattle is placed on feed, feeder cattle basis weakens.

Seasonal dummy variables were usually more significant during the spring months. As noted, there is more variability in feeder cattle basis for feeder cattle that differ from the CME feeder cattle contract specifications than in feeder cattle that meet the specifications. Therefore, the regression models for lighter weight feeder cattle more effectively explained the variation in basis than for heavier weight feeder cattle.

Conclusion

Understanding factors affecting feeder cattle basis are important to hedging. Considerable variability exists in feeder cattle basis, both for steers and heifers and for cattle of different weights. Steer basis is greater than heifer basis for all weight groups. Basis declines as weight increases and variability in basis declines as weight increases.

The best estimate of next week's basis is this week's basis. The other most important factor was live cattle futures market prices, especially for heavier weights of feeder cattle. On the supply side, wheat prices were more important in explaining feeder cattle basis than corn prices. While wheat is not usually the primary grain in feedlot rations, it may serve as a gauge of

the value or availability of wheat pasture, which is important in Oklahoma's stocker cattle production. Cattle placements also were a significant supply indicator, especially for lighter feeder cattle. Overall, demand and supply variables clearly affected feeder cattle basis.

References

- Eilrich, F.C. "An Analysis of Factors Influencing Feeder Cattle Futures Contract Basis and Specifications." M.S. Thesis. Oklahoma State University, 1987.
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