

CATTLE PRICE FORECAST ERRORS IN THE LAST 10 AND 15 YEARS: FUTURES AND SEASONAL INDEX

The Live Cattle Futures is a single location where anyone with an opinion on what prices will be in the future can essentially vote their forecast. The resulting Futures prices represent a “composite” forecast at a particular point in time. Because cattle prices follow a fairly predictable seasonal pattern, it is possible to forecast prices based on the current price and the assumption that history is a predictor of the future.

Table 1 summarizes the two quarterly forecasting methods described above for the 1995-2004 period. We evaluated the Futures market forecast by using the closing Futures price one week after the Cattle on Feed report was released for January, April, July and October and adjusted it for the previous 5-year average basis. A price was forecast for each month and the three months were averaged into the quarter. The Seasonal Index was based on the monthly average price for the same month as the report (i.e., January average price following the January report) to forecast a price for each of the next 12 months, and then averaged three months into each quarter. These forecasts were then compared to the actual average price for the first quarter 1995 through the fourth quarter 2004.

The forecast error was defined as the actual price minus the forecast price. A positive error means the forecast was too low. A negative number means the forecast was too high. On average both forecasts work pretty well for the four quarters, varying from \$-0.37/cwt to \$0.95/cwt. The Index tends to overestimate prices, with exception in the four quarter out. Futures consistently underestimated actual prices by a small amount.

Perhaps more important than the average errors is the variability of errors. One measure of the variability is the standard deviation. If the errors are distributed in a “bell-shaped” curve around the average, then about two-thirds of the time the actual price will be within plus or minus one standard deviation of the average. For example referring to Table 1, there is about a 68% chance that first quarter prices will be from \$5.24/cwt below the Seasonal Price Index forecast to \$5.24/cwt above the Seasonal Price Index forecast. The standard deviation is higher for the Index in the two first quarters in the future than it is in the Futures. The extreme misses are, in most cases, worse for the Index than the Futures.

To put the variability of forecast errors in perspective consider a two quarters out Futures price forecast. On average we would expect the actual price to be \$0.59/cwt higher (the average forecast error) than the basis adjusted Futures price. For example, assume Futures one week after the July report forecast a \$86 cash price for October - December (two quarters out from July). The \$0.59/cwt adjustment suggests that prices in October - December will average \$86.59. However, the \$4.97 standard deviation warns us of prices higher or lower than this range. Thus, there is a 16% chance, about one in six, that prices will be below \$81.62, and a 16% chance they will be greater than \$81.62 or above \$91.56.

Table 1 – Summary of Cattle Price Forecasting Errors (\$/cwt), Futures with Five-year Basis, and Ten-year Seasonal Index (1995-2004).

Forecast Error One Quarter Out

	Index	Futures
Average	-0.26	0.05
Std Dev	5.24	3.86
Min	-18.28	-14.78
Max	13.82	6.73

Forecast Error Two Quarter Out

	Index	Futures
Average	-0.37	0.59
Std Dev	6.18	4.97
Min	-18.11	-9.58
Max	11.12	12.12

Forecast Error Three Quarter Out

	Index	Futures
Average	-0.11	0.95
Std Dev	6.29	6.33
Min	-17.01	-11.73
Max	11.91	14.41

Forecast Error Four Quarter Out

	Index	Futures
Average	0.56	0.80
Std Dev	5.89	6.89
Min	-15.71	-13.06
Max	14.48	16.93

In Table 2 there is a comparison between two periods, 1991 to 1997 and 1998 to 2004. That table can provide an idea of how the forecasts are behaving and if our forecasting tools are still effective.

Comparing across the two time periods we can see two different behaviors in the method of forecasting. The Index demonstrates a greater standard deviation in 1991-1997, then does Futures in the same period. The Index forecasts average higher in the both period, but more accurate in 1998-2004. Futures tend to forecast lower in both periods, but tend to have more forecast error in the 1998-2004.

Table 2 – Summary of Cattle Price Forecasting Errors (\$/cwt), Futures with Five-year Basis, and Ten-year Seasonal Index (1991-1997 and 1998-2004).

Forecast Error One Quarter Out

	1991-1997		1998-2004	
	Index	Futures	Index	Futures
Average	-0.72	0.19	-0.24	0.18
Std Dev	3.12	3.09	5.97	4.39
Min	-5.56	-4.08	-18.28	-14.78
Max	5.47	8.01	13.82	6.73

Forecast Error Two Quarter Out

	1991-1997		1998-2004	
	Index	Futures	Index	Futures
Average	-0.79	0.23	-0.38	0.88
Std Dev	4.93	4.58	6.55	5.29
Min	-9.77	-6.91	-18.11	-9.58
Max	9.83	10.92	11.12	12.12

Forecast Error Three Quarter Out

	1991-1997		1998-2004	
	Index	Futures	Index	Futures
Average	-1.13	0.90	-0.08	1.10
Std Dev	5.78	5.25	6.76	6.95
Min	-10.84	-7.74	-17.01	-11.73
Max	11.91	12.08	9.28	14.41

Forecast Error Three Quarter Out

	1991-1997		1998-2004	
	Index	Futures	Index	Futures
Average	-1.57	0.82	1.09	1.07
Std Dev	5.60	5.53	6.39	7.62
Min	-11.32	-7.53	-15.71	-13.06
Max	7.25	13.59	14.48	16.93

Table 3 shows the average forecast error by month of the report for the last 15 years, 1990 to 2004. The standard deviation of the January Index forecast error is high in all quarters. In the other periods, the variability follows the usual model and increases with the quarters, so the standard deviation increases with the distance from the present. On average, the Index forecast error is greater than the Futures forecast errors in January and July.

Table 3 – Summary of Cattle Price Forecasting Errors (\$/cwt), Futures with three-year Basis, and Ten-year Seasonal Index during the last 15 years (1991-2004).

January Forecast Error

	One Quarter Out		Two Quarter Out		Three Quarter Out		Four Quarter Out	
	<i>Index</i>	<i>Futures</i>	<i>Index</i>	<i>Futures</i>	<i>Index</i>	<i>Futures</i>	<i>Index</i>	<i>Futures</i>
Average	-1.14	0.66	-2.08	0.05	-1.99	1.17	-1.76	0.71
Std Dev	7.36	3.28	7.20	4.28	6.90	6.38	7.24	7.93

April Forecast Error

	One Quarter Out		Two Quarter Out		Three Quarter Out		Four Quarter Out	
	<i>Index</i>	<i>Futures</i>	<i>Index</i>	<i>Futures</i>	<i>Index</i>	<i>Futures</i>	<i>Index</i>	<i>Futures</i>
Average	-0.66	1.06	-0.18	2.58	-0.05	1.83	0.81	2.74
Std Dev	2.77	4.53	5.04	5.54	6.93	6.79	8.12	6.70

July Forecast Error

	One Quarter Out		Two Quarter Out		Three Quarter Out		Four Quarter Out	
	<i>Index</i>	<i>Futures</i>	<i>Index</i>	<i>Futures</i>	<i>Index</i>	<i>Futures</i>	<i>Index</i>	<i>Futures</i>
Average	0.54	0.42	0.55	-0.05	2.30	2.74	1.31	1.00
Std Dev	3.28	2.07	5.04	4.30	6.55	5.24	7.48	6.22

October Forecast Error

	One Quarter Out		Two Quarter Out		Three Quarter Out		Four Quarter Out	
	<i>Index</i>	<i>Futures</i>	<i>Index</i>	<i>Futures</i>	<i>Index</i>	<i>Futures</i>	<i>Index</i>	<i>Futures</i>
Average	-0.93	-1.08	0.13	1.25	-0.68	0.94	1.72	1.47
Std Dev	4.42	5.13	8.35	4.70	8.51	5.33	9.01	4.75

Summary

Basis adjusted Futures and Seasonal Price Indexes were compared as Live Cattle forecasting tools. In general, the Futures forecast had a smaller forecast error. However, the average error is likely larger than most producers realize. The study quantifies the amount of forecast error and producers can use this information to determine the need for price risk protection.