

## Live Cattle Futures and Options: How Have They Done?

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#### Summary

**Futures did reduce price risk. Hedging produced a higher minimum return and higher return at the 25th percentile (75% of the returns are better than this figure) than did the cash market. The 50th percentile, or median return, was higher for yearlings in the cash market than hedged cattle, and the calves had mixed results. Although the differences are not great, there have been months when the option strategies performed better than cash or futures, (i.e., January–April and September–October), and there are months when they did not fare well (i.e., June–August).**

#### Introduction

Futures and options for fed cattle have been available since the mid 1960s and early 1980s, respectively. Relatively few producers use them, yet we still hold educational meetings on how they work. Following a brief discussion on risk management and efficient markets, this paper will briefly describe a recent analysis of both futures and options and their effectiveness over the last decade.

Risk is defined as the chance of an unfavorable outcome. This simple definition means that we focus on the “bad” things that may or may not happen (lower selling prices, higher input prices, high mortality or morbidity).

Generally, livestock price risk is far greater than production risk. In Midwest feedlots variation in the price of fed cattle, feeder cattle, and corn explained 74 percent of the variation in returns to feeding yearling steers compared with less than 10 percent due to variation in average daily gain (ADG) and feed efficiency. Futures and options can address price risk.

Farmers in general and cattle feeders in particular perceive two types of risk:

1. the risk of sinking the ship: the fear of losses (or accumulation of losses) large enough to put them out of business, and
2. the risk of missing the boat: the fear that if they do sell or hedge, prices may go higher later (and they will miss out).

The challenge is to capture acceptable profits while keeping the business afloat. Thus, it is important to differentiate between risk management and price enhancement. Often futures and options are shunned because the average net price from using them is lower than the cash market price. The use of futures or options does not enhance the price. If they are used to reduce risk, then

evaluate them on the basis of the size of losses or percentage of time that losses occurred.

Modern markets are also very efficient in that they quickly incorporate information and expectations of all market participants. Thus it is impossible to consistently “outguess” the markets. Likewise, because large-scale, professionally managed feedyards are willing to work on thin margins, it is difficult to hedge a price much above breakeven given the price of feeder cattle at the time. Profit seeking individuals will quickly bid any futures price increase into the price of feeder cattle. As a result, a common complaint of Iowa cattle feeders is that the futures do not offer enough profit potential to make them worth using. Typically then, these cattle feeders take their chances in the cash market.

#### Materials and Methods

If the cattle market is so efficient, is it possible to hedge a profit or are the Iowa cattle feeders right? Table 1 shows the percentage of trading days during a six-month feeding period that the futures price, adjusted for a five-year-average basis (see recent basis information at <http://www.econ.iastate.edu/faculty/lawrence/ Acrobat/cattle-Basis95-99.pdf>), produced an expected hedge price that was equal to or better than the projected breakeven for yearling feeders. Some years (reading across the rows) did not provide many opportunities for hedging a profit; i.e., 1991, 1996, and 1998. Other years, such as 1993 and 1999, had several days when breakeven or better could be hedged. Also note that there are certain months (March and April) that generate a breakeven or better hedge year after year. June, July, August and December, however, have lower chances. As may be expected, these months tend to have the same results in the cash market. Spring months are more profitable than summer months.

Table 2 indicates the average percentage of trading days during the feeding period (reported by the month the cattle are sold) that a futures hedge produced a return of breakeven +/- \$X/cwt. For example, on the average, a feedlot could hedge a price that was \$4/cwt below breakeven 96 percent of the days during the feeding period ending in January. Reading down the column, it could hedge a breakeven 67 percent of the time, and a \$4/cwt profit only 16 percent of the days for cattle sold in January. Table 2 indicates that the possibility of hedging profits greater than \$3/cwt are pretty rare, and that cattle sold in March and April are the only ones that had more than a 60% chance of hedging a profit greater than \$1/cwt. The markets are efficient.

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### Results and Discussion

During the time period studied, returns were higher to yearling cattle feeders than to calf feeders (Table 3). The 0% hedged column shows the estimated returns to staying in the cash market. Futures, used at any level, did not enhance price over the cash market because average returns were lower for all futures levels compared across all months. However, hedged yearlings sold in May and August had higher returns than the cash market. Calves sold in May and December had higher returns when hedged than the cash market.

The options strategies were only evaluated for yearlings and produced average returns between those of the 50% and 100% hedged strategies (Table 4). However, they provided less risk protection than did the futures. The minimum and 25th percentile returns were lower than those provided by futures, but were better than the cash market. The 50th percentile returns were comparable to the 50% hedged results. These findings are not surprising in that options will always produce a “second best” outcome. That is, if prices decline, futures will pay more, and if prices rise, the cash market will pay more. Put options let you choose which price to take advantage of, but you pay the option premium for the right to choose.

Figures 1 and 2 focus on calves sold in May and June (similar to a retained ownership program), and span a longer time period than shown in the tables. Although the cash market averaged higher returns than hedging across all months in 1991-99, hedging fared pretty well for calf-feds sold in May and June. A great many calves hit the market at this time, and seasonally, the price typically declines.

### Implications

**Does the absence of large guaranteed profits mean that futures and options have no value to cattle producers? No. It means that these are available tools that provide opportunities for cattle feeders to**

**minimize losses, increase the probability of a positive return, or simply expand their operation by demonstrating to lenders their ability to generate a more predictable return.**

**An analysis of simple futures and option strategies is summarized in the tables and graphs that follow. The cost of production estimates are based on the Iowa State University Estimated Returns to Feeding Yearling Steers and Steer Calves. These estimates are based on feeding a yearling steer from 750 to 1,250 pounds over a six month feeding period and a steer calf from 550 to 1,150 pounds over 8 months. Futures were sold when the cattle went on feed and were bought back when the cattle were sold. Similarly, put options were bought (call options sold) at the start of the feeding period and were sold (call options bought back) at the end of the feeding period.**

**The option strategies considered included: buying an out-of-the-money put option (OTM PUT), buying an at-the-money put (ATM PUT), buying an in-the-money put (ITM PUT), and an out-of-the-money fence strategy (OTM FENCE) that bought an out-of-the-money put and sold an out-of-the-money call. The OTM and ITM strategies used the first strike price out of or in the money, respectively.**

### Acknowledgments

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**Table 1. Percent of trading days during six month feeding period that breakeven or better could be hedged for yearlings.**

	Month sold											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1990	74	40	100	100	39	3	0	40	51	44	2	1
1991	16	56	99	90	7	2	0	20	76	70	81	42
1992	0	92	98	97	37	77	28	95	98	98	98	0
1993	98	97	97	96	96	97	82	88	89	70	81	55
1994	58	17	96	97	88	64	47	33	30	34	98	98
1995	98	89	99	99	95	48	0	0	0	34	91	91
1996	98	83	71	50	30	0	14	21	49	89	85	88
1997	96	97	97	96	96	96	97	97	97	54	19	20
1998	41	20	48	41	98	9	57	58	38	23	24	43
1999	91	98	100	98	100	98	91	80	99	99	98	98
Avg.	67	69	90	86	69	49	42	53	63	61	68	54

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**Table 2. Percent of trading days during six month feeding period that breakeven +/- \$X/cwt could be hedged for yearlings, 1990-1999.**

BE + \$/cwt	Month sold												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg.
-\$4	96	95	96	97	93	81	79	85	90	92	96	86	90
-\$3	93	94	96	95	90	72	70	77	85	88	94	81	86
-\$2	88	88	94	92	83	66	58	70	76	82	87	70	80
-\$1	77	80	92	90	76	57	49	63	70	73	78	63	72
\$0	67	69	90	86	69	49	42	53	63	61	68	54	64
\$1	59	53	84	80	59	44	30	39	55	45	56	40	54
\$2	45	38	70	74	53	35	18	23	42	36	40	29	42
\$3	32	25	58	65	48	26	13	11	29	28	29	21	32
\$4	16	14	50	52	40	20	6	5	13	21	22	13	23

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**Table 3. Average returns to feeding calves and yearlings hedged at different levels, 1991-99 (\$/hd).**

<b>Steer calves 550-1,150 pounds</b>					
<b>Sold</b>	<b>Percent hedged</b>				
	<b>0</b>	<b>25</b>	<b>50</b>	<b>75</b>	<b>100</b>
Jan	1.03	-1.13	-3.28	-5.44	-7.60
Feb	16.51	12.74	8.97	5.19	1.42
Mar	33.95	29.98	26.01	22.04	18.06
Apr	27.83	25.17	22.51	19.85	17.19
May	21.78	23.38	24.98	26.58	28.18
Jun	10.97	9.69	8.40	7.12	5.84
Jul	-6.59	-9.28	-11.97	-14.65	-17.34
Aug	-8.22	-11.16	-14.10	-17.04	-19.97
Sep	-12.54	-15.19	-17.84	-20.50	-23.15
Oct	-13.01	-14.93	-16.84	-18.75	-20.67
Nov	-13.94	-15.14	-16.33	-17.53	-18.72
Dec	-23.92	-22.56	-21.19	-19.83	-18.46
<b>Across all months</b>					
Average	2.82	0.96	-0.89	-2.75	-4.60
Minimum	-125.75	-111.07	-102.39	-101.76	-101.12
25th percentile	-57.54	-49.50	-38.38	-31.59	-27.80
50th percentile	-2.00	0.50	1.83	-5.63	-2.59

<b>Yearling steers, 750-1,250 pounds</b>					
<b>Sold</b>	<b>Percent hedged</b>				
	<b>0</b>	<b>25</b>	<b>50</b>	<b>75</b>	<b>100</b>
Jan	15.01	14.95	14.89	14.83	14.78
Feb	26.04	22.86	19.68	16.51	13.33
Mar	43.44	37.51	31.58	25.65	19.72
Apr	37.48	33.48	29.49	25.49	21.49
May	8.83	10.92	13.00	15.09	17.18
Jun	-21.59	-22.88	-24.18	-25.47	-26.77
Jul	-22.21	-22.73	-23.24	-23.76	-24.28
Aug	-10.36	-10.15	-9.94	-9.72	-9.51
Sep	1.65	-0.38	-2.41	-4.45	-6.48
Oct	20.07	16.80	13.54	10.28	7.02
Nov	33.80	29.81	25.83	21.84	17.85
Dec	10.85	11.68	12.51	13.33	14.16
<b>Across all months</b>					
Average	11.92	10.16	8.40	6.64	4.87
Minimum	-139.38	-113.32	-91.86	-92.42	-92.99
25th percentile	-40.89	-32.52	-24.15	-18.06	-19.90
50th percentile	20.57	19.85	11.64	4.06	5.07

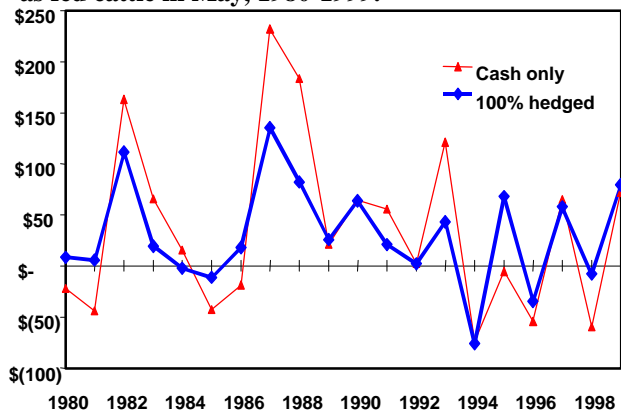
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**Table 4. Summary of returns to yearlings by month sold and risk management tool, (\$/head 1991-99).**

	Summary and distribution of returns by risk management tool						
	0% Hedge	50% Hedge	100% Hedge	100% OTM PUT	100% ATM PUT	100% ITM PUT	100% OTM FENCE
Average	11.92	8.40	4.87	6.38	5.96	6.97	6.06
Minimum	-139.38	-91.86	-92.99	-104.86	-108.24	-112.61	-92.61
25 <sup>th</sup> percentile	-40.89	-24.15	-19.90	-29.33	-30.67	-26.50	-20.22
50 <sup>th</sup> percentile	20.57	11.64	5.07	8.95	10.65	11.07	12.75
<-\$30 (%)	32.4	20.4	15.7	25.0	25.9	23.1	24.1
-\$30-0 (%)	9.3	19.4	28.7	14.8	14.8	19.4	14.8
\$0-30 (%)	13.0	30.6	28.7	29.6	29.6	28.7	28.7
\$30-60 (%)	19.4	19.4	21.3	15.7	16.7	18.5	22.2
\$60-90 (%)	15.7	7.4	3.7	8.3	8.3	5.6	9.3
\$90-120 (%)	4.6	2.8	1.9	4.6	2.8	3.7	0.9
\$120+ (%)	5.6	0.0	0.0	1.9	1.9	0.9	0.0

	Average return by month sold and risk management tool, 1991-99						
	0% Hedge	50% Hedge	100% Hedge	100% OTM PUT	100% ATM PUT	100% ITM PUT	100% OTM FENCE
Jan	15.01	14.89	14.78	16.13	17.13	21.25	16.40
Feb	26.04	19.68	13.33	21.77	21.53	24.26	19.92
Mar	43.44	31.58	19.72	34.52	30.93	27.54	24.56
Apr	37.48	29.49	21.49	27.09	23.69	19.91	22.01
May	8.83	13.00	17.18	7.43	8.53	12.15	10.47
Jun	-21.59	-24.18	-26.77	-28.51	-28.19	-26.43	-18.94
Jul	-22.21	-23.24	-24.28	-33.68	-32.63	-28.49	-28.83
Aug	-10.36	-9.94	-9.51	-14.95	-18.57	-19.74	-17.78
Sep	1.65	-2.41	-6.48	1.89	3.14	8.17	-0.85
Oct	20.07	13.54	7.02	22.05	22.59	23.14	18.79
Nov	33.80	25.83	17.85	22.66	22.15	21.48	21.02
Dec	10.85	12.51	14.16	0.16	1.26	0.39	5.90

**Figure 1. Return per head to spring born calves sold as fed cattle in May, 1980-1999.**



**Figure 2. Return per head to spring born calves sold as fed cattle in June, 1980-1999.**

