

File B2-54 April 2016 www.extension.iastate.edu/agdm

How Often Can Cattle Feeders Hedge a Profit with Futures?

attle feedlots face significant market risk during each feeding period. Research on Midwest feedlots has indicated that approximately 74 percent of the variation in cattle feeding returns is due to changes in the prices of fed cattle, feeder cattle, and corn; while approximately 10 percent of the profit variation is due to production risk from average daily gain and feed efficiency. (Lawrence, Wang, and Loy 1999).

Live cattle futures offer a method to reduce price risk by hedging a selling price at or above the cattle's cost of production. This analysis is meant to discover how often it is possible to hedge a profit. Twenty years of data from 1996-2015 was analyzed to determine the percent of trading days during calf and yearling feeding periods that live cattle futures (LCF) - adjusted for an expected basis - were above the cost of producing fed cattle. The analysis was extended to look at the percent of trading days that a return between a \$4/cwt loss and a \$4/cwt profit could be hedged.

Method and Data

Breakeven price data comes from <u>Iowa State</u> <u>University Estimated Returns to Finishing</u> <u>Yearling Steers and Finishing Steer Calves</u>. This series reports an estimated cost of production per hundredweight (cwt) and profit per head for each month based on relevant cattle and feed prices and interest rates. Cattle are assumed to be placed on the 15th of each month and sold on the 15th of the marketing month. If the 15th was not a trading day, they were bought or sold on the previous trading day. The underlying assumption is that the final breakeven price is accurately predicted at the start of the feeding period.

Daily closing futures prices were adjusted to a hedge price using a historic basis estimate as the expected basis. This expected basis for each month is the previous five-year average basis. The expected hedge price was compared to the estimated breakeven price each trading day of the 180-day feeding period for yearlings and the 210-day feeding period for calves. The percent of trading days that the expected hedge price was greater than the breakeven price out of the total number of trading days is reported in Tables 1.1 and 1.2. This process was repeated for different target levels of return from a \$4/cwt loss through a \$4/cwt profit. These results are reported in Tables 2.1 and 2.2.

Results and Discussion

Tables 1.1 and 1.2 show the percentage of trading days that produced a hedge that was equal to or better than the projected breakeven price for calves and yearlings fed to slaughter. For example, 51 percent of the trading days during feeding period for calves sold in February 2015 provided the opportunity to hedge a profit. A simple average across the months for each year is reported in the column on the right and averages for each selling month are reported in the row across the bottom.

Several trends appear in the calf data. Some years had few opportunities to hedge to breakeven (2001, 2002, 2008, 2009, 2013, and 2015), while the rest provided more opportunities. Monthly variation also existed in the opportunity to hedge to breakeven. April and May provided the best opportunities of hedging to breakeven carrying a 63 percent chance, while the month with the lowest chance of hedging to breakeven was October which provided a 16 percent chance. Over the entire time period studied, 37 percent of the days offered a breakeven hedge.

There are trends in the yearling data as well. The years of 2001, 2008, 2012, and 2015 all provided few opportunities to hedge to breakeven, while the rest of the years provided more opportunities.

Lee Schulz, extension livestock economist 515-294-3356, lschulz@iastate.edu

Table 1.1. Percent of trading days during feeding period that breakeven or better could be hedged for calves, 1996-2015													
	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
1996	39%	35%	84%	66%	92%	57%	17%	8%	30%	46%	39%	81%	50%
1997	100%	100%	100%	100%	100%	100%	100%	100%	99%	43%	14%	20%	81%
1998	52%	46%	61%	42%	91%	42%	35%	0%	8%	1%	0%	0%	31%
1999	12%	75%	96%	99%	100%	100%	94%	90%	71%	59%	100%	92%	82%
2000	100%	100%	99%	100%	100%	100%	84%	21%	22%	1%	14%	21%	64%
2001	14%	11%	27%	74%	68%	15%	4%	1%	0%	0%	0%	0%	18%
2002	0%	0%	26%	26%	59%	48%	6%	0%	0%	0%	0%	10%	15%
2003	43%	77%	93%	100%	100%	100%	2%	12%	22%	36%	38%	57%	57%
2004	52%	51%	51%	53%	8%	22%	32%	45%	42%	62%	68%	61%	46%
2005	10%	0%	2%	91%	77%	90%	40%	13%	0%	1%	0%	2%	27%
2006	33%	63%	72%	69%	24%	13%	0%	0%	0%	2%	4%	8%	24%
2007	0%	0%	17%	23%	49%	55%	43%	32%	49%	1%	27%	26%	27%
2008	15%	0%	0%	4%	2%	0%	10%	3%	11%	11%	46%	63%	14%
2009	51%	44%	33%	23%	40%	16%	2%	0%	0%	1%	0%	2%	18%
2010	15%	0%	42%	99%	100%	96%	80%	56%	18%	1%	0%	3%	42%
2011	31%	15%	38%	57%	65%	47%	8%	0%	0%	0%	0%	0%	22%
2012	39%	1%	91%	96%	80%	28%	0%	0%	0%	0%	0%	0%	28%
2013	0%	19%	3%	0%	0%	0%	0%	0%	0%	0%	27%	74%	10%
2014	89%	74%	100%	100%	95%	95%	43%	38%	60%	66%	83%	80%	77%
2015	65%	51%	28%	38%	2%	0%	0%	0%	0%	0%	0%	0%	15%
Avg	38%	38%	53%	63%	63%	51%	30%	21%	22%	16%	23%	30%	37%

April provided the best chance of hedging to breakeven carrying a 64 percent probability, while the month with the lowest chance of hedging to breakeven was August which had a 22 percent chance. Over the entire time period studied, 40 percent of the days offered a breakeven hedge.

Tables 2.1 and 2.2 show the average percent of trading days by month that a futures hedge produced a return of breakeven +/-\$X/cwt for calves and yearlings. For example, on average, a feedlot could hedge a price that was \$4/cwt below breakeven or better 71 percent of the days during

the feeding period for calves sold in January. Reading down the January column, feedlots could hedge to breakeven 36 percent of the time and to a \$4/cwt profit or better 16 percent of the time.

In the calf market on average, there was a 30 percent chance of hedging to make a profit (\$1/ cwt). April and May provided the best chances of hedging a profit carrying a 55 percent chance of hedging a \$1/cwt profit. Only the months of April and May carried at least a 50 percent chance of hedging a profit.

hedged for yearlings, 1996-2015													
	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
1996	100%	82%	72%	49%	30%	0%	17%	24%	54%	92%	88%	89%	58%
1997	100%	100%	100%	100%	100%	100%	100%	100%	99%	55%	19%	20%	83%
1998	42%	21%	50%	43%	100%	9%	56%	58%	38%	22%	24%	43%	42%
1999	91%	98%	98%	91%	100%	98%	50%	46%	98%	100%	100%	100%	89%
2000	100%	100%	100%	100%	97%	0%	0%	10%	42%	14%	97%	97%	63%
2001	21%	37%	49%	65%	14%	12%	28%	2%	0%	0%	0%	0%	19%
2002	0%	0%	15%	68%	62%	44%	26%	0%	0%	0%	51%	70%	28%
2003	57%	72%	98%	100%	87%	96%	18%	29%	31%	47%	56%	64%	63%
2004	45%	33%	0%	4%	8%	51%	51%	60%	50%	32%	0%	0%	28%
2005	0%	1%	6%	87%	90%	90%	39%	0%	0%	0%	0%	46%	30%
2006	58%	43%	43%	49%	6%	0%	0%	8%	45%	61%	2%	0%	26%
2007	0%	0%	32%	95%	83%	100%	89%	4%	16%	1%	58%	2%	40%
2008	0%	0%	0%	0%	7%	2%	11%	19%	70%	19%	50%	52%	19%
2009	34%	24%	30%	38%	98%	2%	0%	0%	0%	0%	2%	50%	23%
2010	0%	0%	92%	99%	100%	92%	39%	11%	0%	0%	0%	0%	36%
2011	23%	14%	51%	70%	55%	12%	3%	0%	0%	0%	32%	0%	22%
2012	23%	19%	55%	41%	44%	0%	0%	0%	0%	0%	0%	0%	15%
2013	14%	0%	8%	68%	48%	34%	26%	20%	52%	72%	100%	79%	43%
2014	83%	61%	36%	100%	83%	54%	30%	45%	55%	62%	66%	45%	60%
2015	39%	26%	0%	8%	0%	9%	11%	0%	0%	0%	0%	0%	8%
Avg	42%	36%	47%	64%	61%	40%	30%	22%	33%	29%	37%	38%	40%

Table 1.2. Percent of trading days during feeding period that breakeven or better cou	ld b
hedged for yearlings, 1996-2015	

On average in the yearling market, there was a 32 percent chance of hedging to make a \$1/cwt profit. April provided the best chance with a 54 percent chance of hedging a \$1/cwt profit. The month of April was the only month that carried at least a 50 percent chance of hedging a profit.

Summary

This analysis shows that the market for hedging yearlings and calves is efficient. This does not mean that there are no opportunities to hedge for a profit or that hedging is unproductive for an

operation, it simply means that hedging is a way to minimize risk by decreasing losses and increasing the probability of profit.

The past performance studied in this analysis is not a perfect predictor of outcomes, but it can still provide some insight. First, opportunities to hedge a profit vary based on the markets during each year and even each month of the year. Second, there was a relatively low probability of hedging more than \$2/cwt profit in any month. Because of this, it may be prudent to hedge for a profit whenever the opportunity is available.

hedged for calves, 1996-2015													
BE +	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
-\$4	70%	68%	79%	82%	84%	75%	63%	44%	42%	38%	50%	63%	63%
-\$3	60%	60%	71%	78%	79%	70%	56%	36%	35%	32%	43%	56%	56%
-\$2	52%	50%	65%	72%	73%	65%	46%	31%	31%	27%	35%	46%	49%
-\$1	43%	43%	58%	67%	68%	58%	37%	26%	26%	21%	27%	38%	43%
\$0	36%	36%	52%	61%	62%	51%	29%	20%	21%	16%	22%	29%	36%
\$1	30%	31%	46%	55%	55%	43%	22%	15%	15%	11%	18%	23%	30%
\$2	25%	25%	37%	51%	47%	36%	15%	12%	9%	9%	14%	18%	25%
\$3	21%	19%	30%	43%	39%	30%	10%	7%	6%	7%	9%	14%	20%
\$4	16%	13%	23%	36%	33%	25%	5%	5%	4%	6%	7%	11%	15%

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Table 2.2. Percent of trading days during feeding period that breakeven +/-\$x could be hedged for yearlings, 1996-2015

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BE +	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
-\$4	64%	58%	75%	85%	83%	70%	65%	59%	59%	54%	65%	61%	67%
-\$3	58%	52%	67%	80%	80%	60%	56%	49%	52%	47%	58%	54%	59%
-\$2	52%	45%	59%	73%	76%	54%	46%	40%	43%	40%	49%	49%	52%
-\$1	45%	40%	51%	68%	69%	47%	38%	31%	38%	34%	41%	43%	45%
\$0	40%	35%	44%	62%	58%	40%	29%	22%	33%	29%	36%	38%	39%
\$1	37%	30%	37%	54%	47%	34%	20%	17%	26%	23%	30%	32%	32%
\$2	32%	25%	30%	46%	37%	28%	15%	13%	18%	18%	25%	24%	26%
\$3	26%	18%	20%	37%	28%	23%	11%	8%	12%	13%	19%	17%	19%
\$4	18%	11%	15%	25%	23%	18%	7%	7%	7%	10%	15%	12%	14%

... and justice for all

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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Cathann A. Kress, director, Cooperative Extension Service, Iowa State University of Science and Technology, Ames, Iowa.