

Risk Management for Pork Producers: Futures Buy and Sell Signals

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In recent years, the hog market has redefined the parameters of risk and the need for risk management. Lean (or Live) Hog futures is a tool for managing price risk that has been available since the late 1960s, but has seldom been used by producers. Producers often charge that this tool is too complicated to use, and they list margin calls and lack of profit potential as faults of this tool. Because futures markets are very efficient, it is impractical to believe that there is a simple, but profitable strategy that will work every time. However, there are strategies that can narrow the wide array of marketing choices into a more manageable set of choice to evaluate.

In a separate paper, “Managing Hog Price Risk: Futures, Options, and Packer Contracts,” alternative marketing tools for pork producers are evaluated over a 12-year period. The evaluation incorporates cost of production, profit goals, seasonal patterns, and simple price forecasts into the selection of various futures and options strategies to determine how and when to use these tools to accomplish one’s objectives. The analysis in that paper assumed that the producer made one decision at the start of the production period, i.e., when the pigs go into the finisher, and he/she held that market position until the hogs were sold four months later. This simplified analysis allowed alternative strategies to be compared fairly.

In reality, a producer can make marketing decisions any day that the market is open. The decision then becomes one of market timing—*when* to buy or sell a futures contract to reduce price risk or increase the net price received. This paper will evaluate alternative market timing decision rules; more specifically, moving average (MA) strategies, to determine when to enter or exit the futures market. Following a brief description of moving average procedures is a comparison of 42 different MA combinations over 10 years of data and two time horizons.

Market timing signals

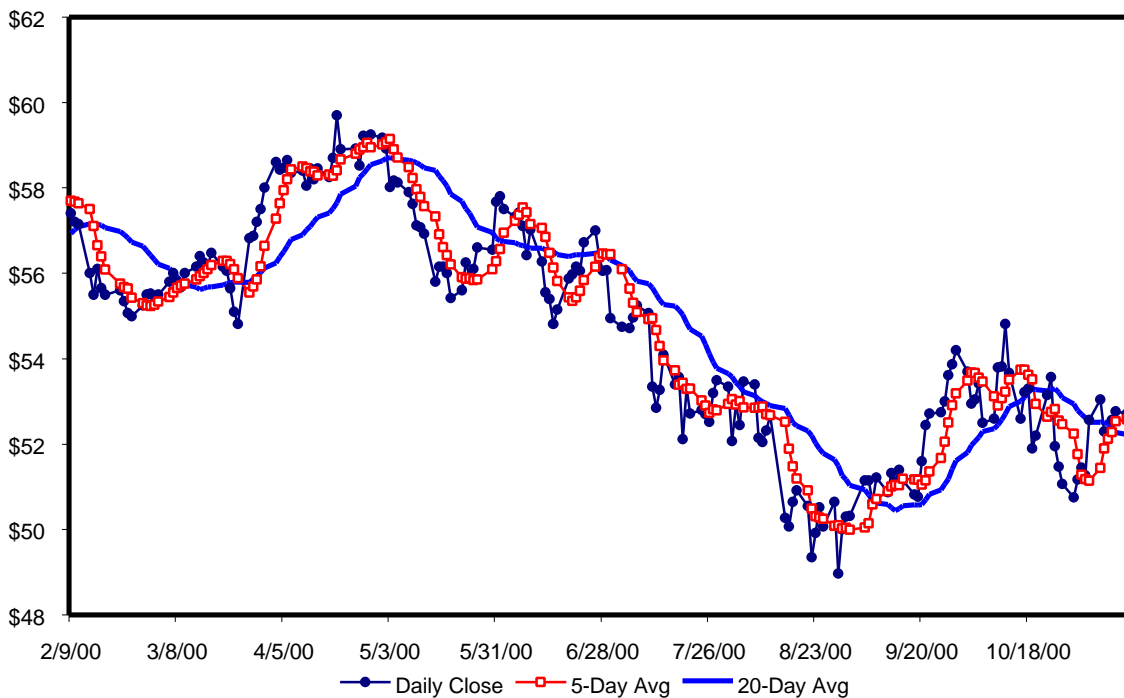
As mentioned earlier, the futures market very quickly adjusts to information. It is nearly impossible for a trading strategy to remain successful for very long. Traders begin to use the information to make buy and sell decisions; as more people use the information, the results become more diluted. Market

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timing and technical trading rules are no different. These trading decisions are often simple enough to be programmed into a computer and are automatically exercised if the trading rule is triggered. While technical trading rules like MA may not be able to beat the market consistently, they do indicate market trends and a directional change in the trends.

A moving average is a simple average of closing futures prices over a given period of time, i.e., 5 days. A new MA can be calculated by removing the oldest price and adding the newest price to the average. Moving average trading rules involve a short-term MA (e.g., 5 days) and a long-term MA (e.g., 20 days). The MA numbers can be plotted on a graph (Figure 1). The short-term MA will change direction more quickly than the long-term MA. Yet, the short-term MA still averages several days together to remove the day-to-day market noise. A change in market direction is signaled when the short-term crosses the long-term MA. For example, if the short-term MA crosses the long-term from below it signals an upturn in the price trend. If the short-term MA crosses from above it signals a downturn in the trend.

Figure 1. December 2000 Hog Futures and Moving Averages



The combination of short-term and long-term MAs acts as a filter for market signals and determines how quickly one reacts to those signals. The trade-off is that the fewer the days included in the MA, the more often the market will trigger a trade, and the more often a commission is paid. The more days included in the MA, the fewer the number of trades will be signaled. There will be fewer

trades, but there may also be missed opportunities. Which combination of short-term and long-term MAs is most profitable and least risky? That is the focus of this analysis and report.

Procedures

Daily futures prices for the Live Hog and Lean Hog futures contracts were examined using data from 1988-1998. All seven contract months were used and evaluated for a producer who was selling hogs on or near the 15th of each month after they had been on feed either six months (birth to market) or ten months (breeding to market). Cost of production for the producer was assumed to be equal to that shown by the Iowa State University Extension Estimated Livestock Returns for the appropriate marketing month. A total of 42 different short-term–long-term combinations were considered in the analysis for a short hedger. Table 1 summarizes the results; the full results can be found at www.econ.iastate.edu/faculty/lawrence/.

Results from alternative moving average futures strategies

Table 1 ranks the strategies by hedging returns (combined cash and futures) and lists the five most profitable MA combinations by selling month for the time period evaluated, and shows the average return (\$/cwt) for a hedger following the strategy. It also lists a *risk ranking* for each strategy. The 25th percentile cutoff is the measure of risk used and is defined as the 10-year average return at the 25th percentile. That is, 25 percent of the time, returns were less than this number; 75 percent of the time, returns were greater than this number. Producers can thus decide if they can risk a 1 in 4 chance of a lower return. The risk ranking lists the 25th percentile value for each strategy from highest to lowest. A higher 25th percentile value has a higher and more preferred risk ranking.

Although somewhat arbitrary, Table 1 lists the five most profitable strategies and their risk ranking out of the 42 combinations. A “good” strategy is one that has a high average return and low risk (a 1 or 2 on both scales). For example, with February marketings over a 10-month hedging period, the #1 ranked average return was also ranked #1 on risk, the 3-30 day combination. However, the #2 strategy in returns was #36 on risk, suggesting that the chance of loss was relatively high compared with other strategies. Note that no single strategy is the best in every month; some work better than others in certain months. Also, there is very little difference in the average returns of the top five strategies in some cases.

How to read the table

- Selling Date – Month in which you will be selling your hogs.
- Average Hedge Ranking – Ranks the average return from hedging over ten years. A #1 ranking means that that strategy returned the highest average hedge return over ten years out of 42 strategies.
- Strategy – The combination of short-term and long-term moving average ranked in the top five according to average net hedge.
- Average Net Hedge – Gives the average hedging return (\$/cwt live weight) dollar amount that was gained or lost if you had used that strategy over ten years.
- Risk Ranking – Returns the ranking according to 25th percentile. That is, returns were less than this number 25 percent of the time, and greater than this number 75 percent of the time. A ranking of #1 means that, out of 42 strategies, that strategy was the least risky.
- 25th Percentile – Gives the return that resulted 25% of the time. In other words, 75% of the time you will receive a higher return than the number listed.

How to use this table

1. Determine if hedging with futures is appropriate for the operation and the time period considered. The report “Managing Hog Price Risk: Futures, Options, and Packer Contracts” compares futures contracts to alternative options strategies and packer contracts, by costs, profit objectives, and selling month.
2. Locate the month in the selling date column in which you will be selling your hogs.
3. Consider either a 6-month or a 10-month time frame. The 6-month hedges begin when the pigs are born. The 10-month hedges begin when the sows are bred.
4. Locate the results. For example, if you plan on selling your hogs in March on a 6-month contract, you have a couple of options. The 12-50 day strategy ranks first in average hedge return, but second in risk. The 12-48 strategy ranks second in average hedge return, but first in risk.

Live Hog Futures Results From Alternative Hedging Strategies For Years 1989-1998.

Selling Date	6-Month Hedges					10-Month Hedges				
	Hedge Ranking	Strategy	Avg. Net Hedge	Risk Ranking*	25th Percentile	Hedge Ranking	Strategy	Avg. Net Hedge	Risk Ranking*	25th Percentile
<i>February Contracts</i>										
Jan. 15	1	9-18 day	-1.50	5	-3.43	1	15-50 day	-1.08	1	-2.86
	2	15-24 day	-1.51	10	-4.46	2	15-48 day	-1.19	3	-3.37
	3	15-48 day	-1.52	13	-4.54	3	15-24 day	-1.29	7	-4.17
	4	12-24 day	-1.56	12	-4.53	4	9-24 day	-1.42	4	-3.53
	5	15-27 day	-1.58	31	-5.53	5	12-27 day	-1.56	2	-3.29
		Cash only	-0.64		-7.71					
Feb. 15	1	5-15 day	1.61	20	-1.99	1	3-30 day	4.63	1	1.66
	2	15-48 day	1.41	2	-0.74	2	3-18 day	2.98	36	-2.41
	3	15-50 day	1.31	4	-0.87	3	3-24 day	2.98	35	-2.33
	4	9-24 day	1.14	23	-2.19	4	15-50 day	2.04	4	0.56
	5	18-50 day	0.95	17	-1.90	5	15-48 day	1.85	6	0.25
		Cash only	1.52		-4.65					
<i>April Contracts</i>										
Mar. 15	1	12-50 day	1.04	2	-2.09	1	12-50 day	1.42	3	-1.84
	2	12-48 day	0.86	1	-1.98	2	15-50 day	0.98	5	-2.70
	3	15-50 day	-0.22	11	-4.01	3	12-48 day	0.95	2	-1.84
	4	9-42 day	-0.24	3	-2.24	4	18-50 day	0.94	9	-3.65
	5	18-48 day	-0.30	8	-3.85	5	15-48 day	0.81	6	-2.72
		Cash only	0.65		-7.21					
Apr. 15	1	18-50 day	0.10	12	-5.51	1	18-50 day	1.18	2	-2.33
	2	12-48 day	0.01	2	-4.21	2	12-50 day	0.81	1	-1.81
	3	12-50 day	-0.02	5	-4.42	3	15-48 day	0.35	10	-3.49
	4	15-48 day	-0.44	21	-5.76	4	12-48 day	0.35	13	-3.57
	5	18-48 day	-0.75	8	-5.30	5	18-48 day	0.24	5	-2.65
		Cash only	1.25		-11.23					
<i>June Contracts</i>										
May 15	1	15-42 day	5.22	1	6.41	1	15-50 day	4.58	3	0.81
	2	12-42 day	5.07	9	4.97	2	9-18 day	4.57	23	-1.46
	3	9-18 day	5.03	2	5.54	3	12-50 day	4.50	4	0.64
	4	15-50 day	4.92	8	5.08	4	15-48 day	4.30	5	0.56
	5	12-50 day	4.85	6	5.21	5	12-48 day	4.29	10	0.16
		Cash only	11.67		-4.58					
Jun. 15	1	9-21 day	6.15	6	8.55	1	9-21 day	4.47	12	1.69
	2	9-24 day	6.11	10	8.43	2	9-18 day	4.45	15	1.56
	3	9-27 day	5.76	9	8.45	3	15-50 day	4.41	2	2.97
	4	9-18 day	5.72	27	7.54	4	3-30 day	4.35	29	-0.34
	5	3-30 day	5.71	23	7.65	5	3-24 day	4.31	30	-0.60
		Cash only	13.78		0.81					

Live Hog Futures Results From Alternative Hedging Strategies For Years 1989-1998.

Selling Date	6-Month Hedges					10-Month Hedges				
	Hedge Ranking	Strategy	Avg. Net Hedge	Risk Ranking*	25th Percentile	Hedge Ranking	Strategy	Avg. Net Hedge	Risk Ranking*	25th Percentile
<i>July Contract</i>										
Jul. 15	1	15-30 day	5.77	4	3.03	1	9-42 day	4.49	2	2.46
	2	5-21 day	5.74	16	2.10	2	5-21 day	4.38	26	0.15
	3	18-50 day	5.71	26	1.64	3	12-48 day	4.35	28	0.14
	4	12-48 day	5.66	25	1.73	4	15-50 day	4.31	7	1.64
	5	18-48 day	5.65	33	1.07	5	5-18 day	4.30	36	-0.38
			Cash only	13.87		3.78				
<i>August Contract</i>										
Aug. 15	1	12-24 day	3.94	5	1.91	1	12-24 day	2.30	6	-0.07
	2	12-50 day	3.36	22	-0.04	2	12-48 day	2.17	11	-0.86
	3	9-30 day	3.32	11	0.70	3	12-50 day	2.04	13	-1.31
	4	12-30 day	3.24	2	2.21	4	12-30 day	1.98	3	0.35
	5	12-48 day	3.24	15	0.25	5	5-21 day	1.80	12	-0.88
			Cash only	10.87		1.15				
<i>October Contracts</i>										
Sep. 15	1	9-30 day	3.19	7	-1.23	1	18-50 day	7.32	1	1.06
	2	9-36 day	3.18	4	-1.01	2	9-30 day	6.89	13	-0.50
	3	9-42 day	3.08	3	-0.99	3	9-42 day	6.87	24	-1.43
	4	12-36 day	2.95	2	-0.88	4	12-36 day	6.78	6	0.23
	5	18-50 day	2.73	32	-3.87	5	15-50 day	6.78	8	0.02
			Cash only	3.69		-1.94				
Oct. 15	1	9-30 day	2.70	3	-0.38	1	3-21 day	1.43	11	-2.10
	2	9-36 day	2.45	12	-1.05	2	9-36 day	1.36	12	-2.19
	3	9-42 day	2.23	13	-1.22	3	3-18 day	1.24	9	-1.95
	4	5-12 day	2.20	21	-1.60	4	3-24 day	1.06	4	-1.49
	5	3-21 day	2.08	16	-1.39	5	12-24 day	1.00	3	-1.36
			Cash only	1.35		0.85				
<i>December Contracts</i>										
Nov. 15	1	12-27 day	0.28	6	-4.24	1	12-27 day	0.24	2	-2.43
	2	12-24 day	-0.09	9	-4.38	2	12-24 day	-0.26	8	-3.11
	3	12-30 day	-0.41	4	-4.02	3	9-18 day	-0.65	16	-3.65
	4	12-36 day	-0.43	3	-3.85	4	12-30 day	-0.80	7	-2.90
	5	5-12 day	-0.99	1	-3.52	5	9-21 day	-0.92	15	-3.57
			Cash only	-7.96		-11.30				
Dec. 15	1	12-27 day	-0.90	1	0.47	1	12-27 day	-1.17	1	-0.98
	2	12-42 day	-1.32	6	-0.72	2	12-24 day	-1.58	2	-1.89
	3	12-36 day	-1.45	7	-1.01	3	12-30 day	-1.85	3	-2.50
	4	12-30 day	-1.53	2	0.03	4	15-30 day	-2.58	5	-3.10
	5	12-24 day	-1.54	3	-0.30	5	3-9 day	-2.60	25	-5.57
			Cash only	-7.38		-13.36				

* 42 different moving average day combination