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MOVING AVERAGES AS AN INDICATOR OF PRICE DIRECTION IN HEDGING APPLICATIONS

John R. Franzmann*

Production and marketing decisions are made in the realm of risk and uncertainty, because we rarely, if ever, know the future with certainty. Information regarding prices in the future is an important ingredient in such decisions, and, so, attempts are made to forecast price information. Both private firms and public institutions are actively engaged in providing forecasts for their respective clientele.

Unfortunately, price forecasters have not produced an enviable track record and have come under considerable criticism recently. A Business Week (March, 1981) article charged that the econometricians have oversold their ability and have built an automatic credibility gap. They have been criticized not only for being "not only consistently wrong", but because "they constantly changed their forecasts in the wrong directions."

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The public sector also has had problems. Extension service outlook information contains price forecasts which have come under fire from various producer groups with some demanding a cease to USDA forecasts. Just and Rausser (1981) compared the accuracy of major commercial price forecasts for corn, wheat, soybeans, soybean oil, soybean meal, cotton, cattle, and hogs. They concluded that, although the results were mixed, futures prices perform relatively better on average although not universally so. Ikerd and Darnell compared the accuracy of Oklahoma State University price forecasts with the forecasts of a National Newsletter, the USDA, two other university economists, and the futures market. They concluded that the "present state of the science indicates that reputable forecasters are not significantly different in their forecasting ability" and that "this level of ability also tends to be reflected in the futures markets".

For the purposes of establishing and terminating hedges, a price forecast, although desirable, is not absolutely essential. For hedging purposes, it is only necessary to discern major turns in market price. Ideally, the turn would be forecast well in advance of the actual turn. But even this is not necessary and has been an area of great difficulty with price forecasting models. Serious errors can occur at the turns. Producers really need only to set their sell hedges at or near major price peaks and establish buy hedges at or near major price lows at the time such turns are occurring.

Selling products at a major price peak or purchasing resources at

major lows is virtually impossible on a sustained basis. The problem for the hedger, therefore, is to set the hedges as near the top as possible. One simple tool capable of detecting turns in market price is the moving average.

Moving averages cannot forecast a turn (unless the price fluctuations followed some mathematical function perfectly). They always, by virtue of their nature, detect turns after they have occurred. But, as indicated above, hedges can be successful if they can be placed near market tops and bottoms.

Some Basic Considerations

Timing is an important aspect of hedge placement. Most econometric models which possess legitimate forecasting ability are based on (at best) quarterly or weekly data. Better hedge placement would be possible if an accurate and reliable model could be developed based on daily data. Brown (1977) has noted that moving averages based on daily data generally can beat an econom tetric model in signalling the time to place hedges. Consequently, they can signal a turn sooner than a technique based on quarterly, monthly, or weekly data.

If a moving average is to be used as an aid in making hedging decisions, it must signal a turn as soon as possible after the turn has occurred. Many producers, following a qualitative, fundamentalist approach to hedging, have been victims of psychological forces which lead to the placement of hedges much too late, if they place them at

all.

Since moving averages, by their nature, always signal turns in a delayed manner, it is necessary to choose a moving average carefully. Zieg and Kaufman (1974) suggested that trading profits from the use of point-and-figure charts would be enhanced if the point-and-figure parameters were "optimized."

The concept of optimization can be applied to the use of moving averages. The contribution of hedging transactions to profits should be enhanced if the hedges were placed and lifted according to an "optimal" moving average.

"Optimal" in the sense used here means most profitable. An average that contains too many days will lag behind the price series too far and produce signals too late. A moving average that contains too few days will signal minor turns and will produce "whipsaw" losses. For a given commodity there can be expected to be some particular moving average or set of moving averages that are most profitable or "optimal".

Given that an "optimal" set of moving averages exists, a producer could then place sell hedges when price weakness is indicated and lift sell hedges when price strength is indicated. The converse would hold for buy hedges. Thus, the producer would hedge only when the nature of the price risk indicated that hedges were warranted. The remainder of the time he would be a cash market speculator as most producers are most of the time. The placement and lifting of hedges

through the use of a set of moving averages is illustrated in Figure 1.

In Figure 1, a sell signal was generated when the 3-day moving average crossed the 5-day moving average from above at $67.50. A "whipsaw" loss occurred when a sell signal was triggered at $65.00 and shortly thereafter a buy signal occurred at $65.25.

Some Evidence

In recent years, several studies have been completed that investigated the potential of moving average systems to enhance the profits of cattle hedges. In a study of Lehenbauer (1978) an "optimized" set of moving averages for feeder futures prices was developed for the period 1972-1977. The optimized moving averages were then employed in several short-hedging and long-hedging simulations.

The results indicated that the use of moving averages to place and lift short hedges increased the average returns and reduced the variability of returns. Similar results were produced for the long-hedging simulations, i.e., average cost of feeders purchased was reduced along with variability in the cost of the feeders.

The results of the simulated short hedging strategies for a small grains production alternative are presented as an illustration (Table 1). It is evident that the moving average strategies increased the average returns significantly over the conventional hedging strategy and also over a no-hedge strategy. Risk, as measured by the standard deviation of returns, is reduced markedly from the no-hedge

ILLUSTRATION OF MOVING AVERAGES

TO PLACE AND LIFT HEDGES

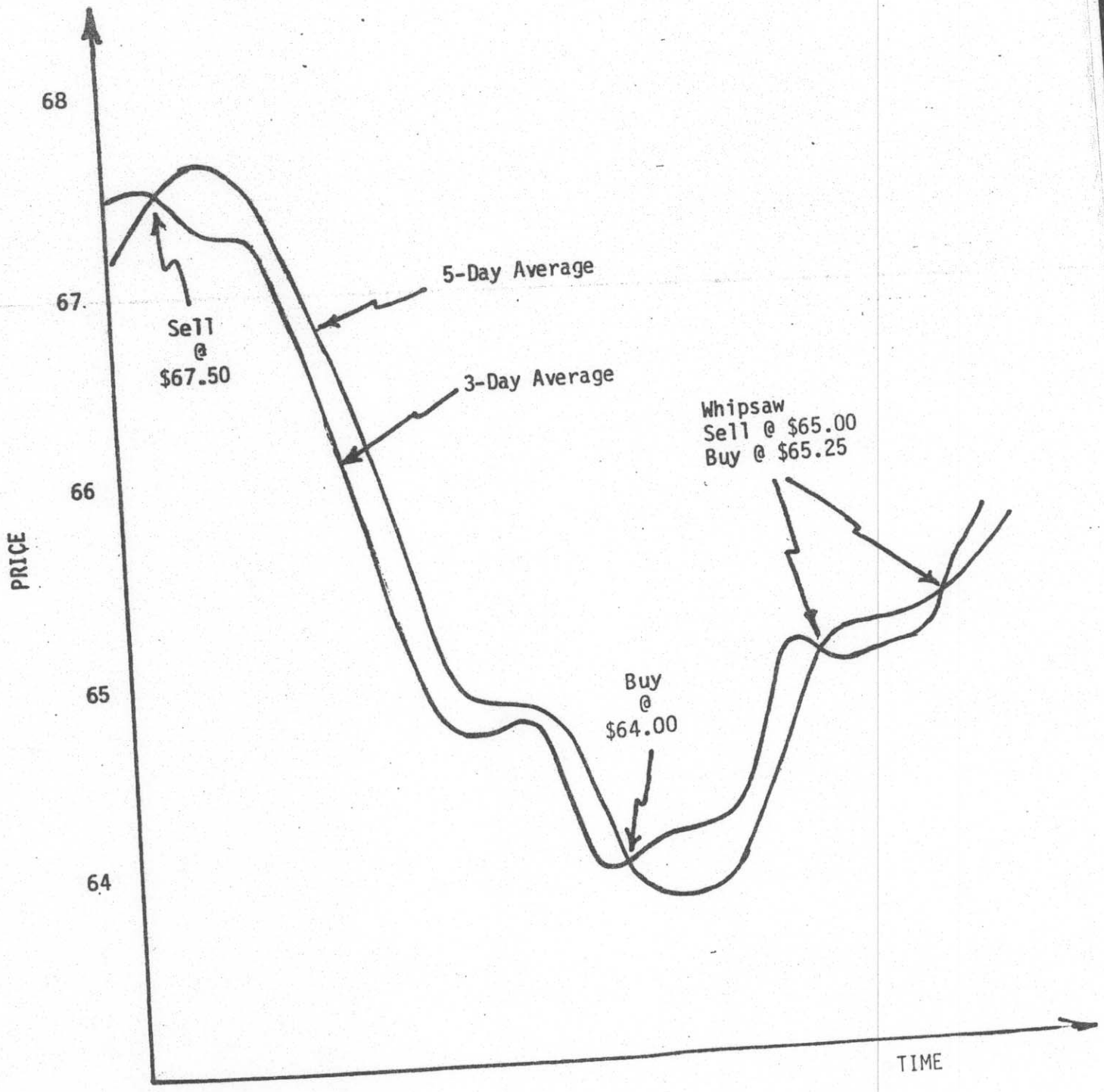


Figure 1

Table 1. Results of simulated short hedging strategies for the small grains grazing production alternative in dollars per head (1972-1977)

Strategy[a]	Average return	Change in returns from strategy 1	Standard deviation of return	Low return	High return
1. No hedge	13.20	-	50.13	-69.03	85.04
2. Hedge and hold	4.67	-8.53	13.92	-16.15	24.28
3. 3-10	21.64	+8.44	20.76	-1.80	48.75
4. 4w-5-10	22.04	+8.84	23.70	-0.19	60.71
5. 8-4w ($0.05)	21.67	+8.47	16.63	+2.16	43.54

[a]3-10 represents a 3-day moving average coupled with a 10-day moving average; 4w-5-10 represents a 4-day linearly weighted moving average coupled with a 5-day and a 10-day set of moving averages; 4-8w ($0.05) represents a 4-day moving average coupled with an 8-day linearly weighted moving average and a $0.05 penetration rule.

strategy. The risk, associated with the moving average strategies, is greater than with the conventional hedge but not five times greater in this case.

The work completed by Shields in 1980 provides additional evidence. He concluded that feedlots using moving averages to hedge feeder cattle, corn, and live cattle could have increased profits by 44 percent and reduced price risk by 49 percent. Table 2 compares the results of a no-hedge strategy with a "complete" hedging strategy over the period 1975-1979. In each of the years investigated, the hedging strategies using the moving averages technique closely approximated the results of the no-hedge strategy or were significantly better.

The studies by Lehenbauer and Shields, although demonstrating the possibility of greater profits through the use of hedging demonstrate the ability of such a technique to detect significant turns in market price. The relationship of the moving average signals to the turns in market price can be best illustrated by means of a graphic display such as Figure 2.

Figure 2 shows the history of the February live cattle futures contract through September 30, 1981. The hedge signals are indicated by means of arrows. An arrow pointing southward is an indication to place a sell hedge on the following day. An arrow pointing northward is an indication to lift the sell hedge.

The moving average set used in this illustration was successful in producing a sell signal within 27.5 points of one of the price highs. It also produced several other less successful signals Since

Table 2. Distribution by Years of the Production Margin[a] in Dollars per Head Marketed (1975-1979)

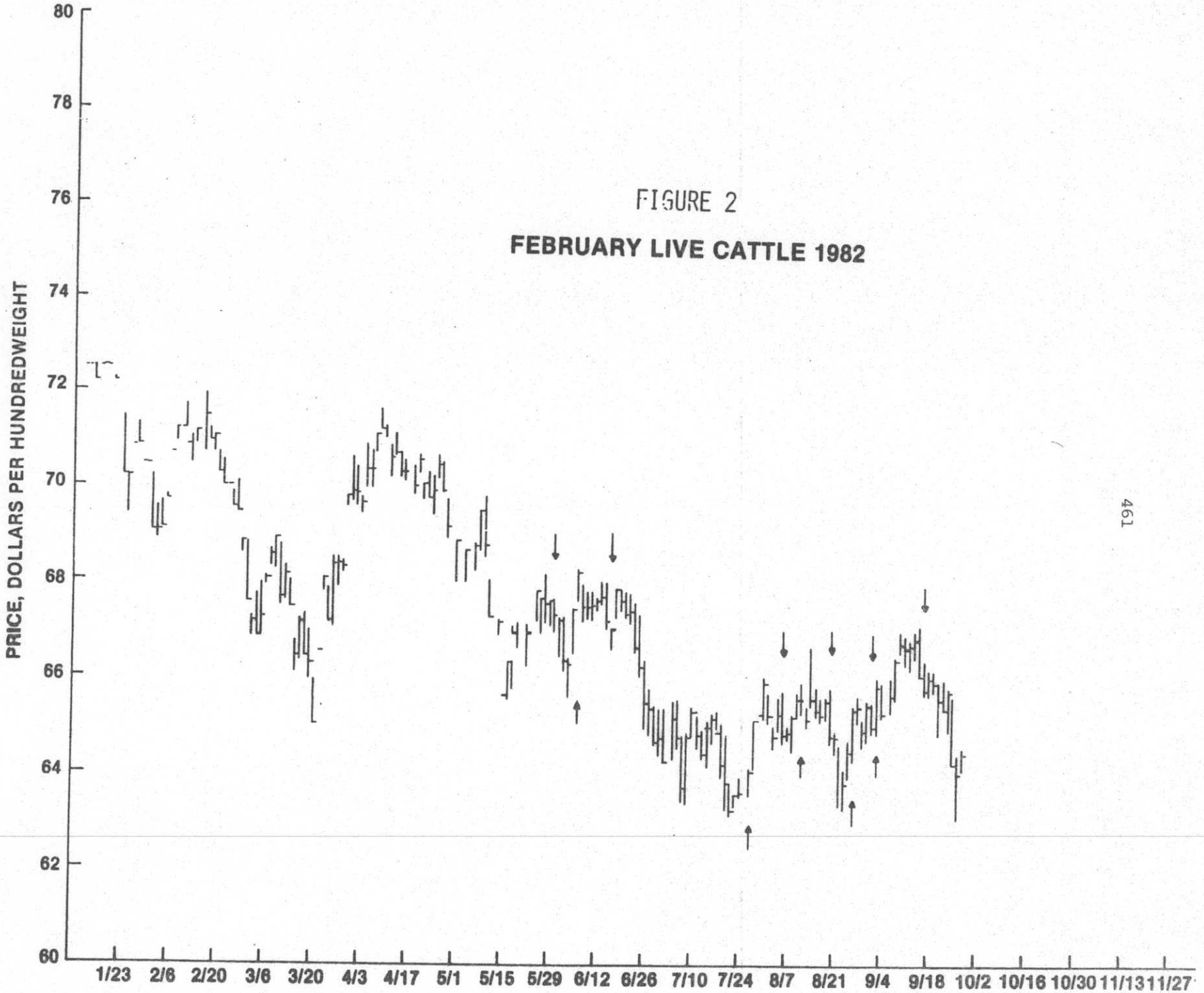
	1975	1976	1977	1978	1979	Yearly average
No hedge strategy	149.46	0.12	39.75	108.83	75.14	74.66
Hedging feeder cattle, corn and live cattle by means of moving averages[b]	147.51	81.54	39.23	141.64	122.64	106.51

[a]Production margin refers to the margin between the costs of feeder cattle and corn and revenues from the sale of fat cattle.

[b]The moving averages used in this strategy were: 3-4-6 ($0.07) for feeder cattle, 7w-15-26 ($.009) for corn; and, 1-3-5w ($0.09) for live cattle.

FIGURE 2

FEBRUARY LIVE CATTLE 1982



June 2, 1981, the moving averages system inaugurated and closed five sell hedges which grossed a +207.5 points. Open profits as of October 6, 1981, amounted to +240 points. If commissions of $60 per round turn were charged and all positions closed the hedger would net, as of October 6, and addition to the cash price of $3.575 per hundredweight. A summary of the hedging transactions made according to the signals from a 1-day, 3-day, and 5-day linearly weighted set of moving averages over the period June 2, 1981 through October 6, 1981 is presented in Table 3. Examples from other time periods reveal

Table 3. Summary of Short Hedges Signaled from a Set of Moving Averages Applied to the February 1982 Live Cattle Contract, June 2, 1981 - October 6, 1981

Date	Price hedge placed	Price hedge lifted	Cumulative gross profit
6-2-81	$67.25	$67.525	$-110.00
6-18-81	67.925	65.225	+970.00
8-7-81	74.975	95.25	+840.00
8-21-81	64.90	65.50	+600.00
9-3-81	65.925	65.35	+830.00
9-18-81	66.10	-	+1790.00[a]

[a]Hedge remains in place on October 6th. Cumulative profit includes $960 in open profit.

similar results. A long history of such trades indicates that only about 45 percent of the trades are profitable. However, the "optimized" moving averages permit hedgers to follow the trading maxim: cut your losses quickly and let your profits run.

Futures markets frequently will move counter to the main trend creating the potential for false signals. At the time the signals occur, however, it is difficult to determine whether the action is indicative of a true major turning point or not. For the hedger it is prudent to accept the signal rather than attempt to outguess the system which historically has demonstrated that profitability is increased when the system is followed. When the signals are false, the averages will ordinarily reverse rather quickly thereby resulting in a small dollar loss.

Some Conclusions

Hedgers desire and need a system by which they can place sell hedges near a market top and lift sell hedges near a market low. Ideally, an econometric model would be constructed to predict the market highs and lows. Unfortunately, the track record of price forecasts from econometric models have been perceived as unsatisfactory by a number of user groups.

An alternative technique to be used while econometric forecasting is improved is the use of an "optimized" set of moving averages.

Although it is clear that moving averages always signal the turns

in market price after the fact, because they are computed on a daily basis, they still have the capacity of signalling the placement and lifting of hedges closer to the actual peak than the econometric models.

Moving averages systems applied to live cattle and feeder cattle futures contracts have demonstrated that profits can be enhanced through multiple hedging strategies, i.e., hedging more than once during a production period.

The evidence presented in conjunction with the February live cattle contract is only illustrative, but not atypical. The research evidence covering several years of trading history demonstrates the profitability of such systems when followed consistently. This conclusion follows despite the fact that the percentage of profitable trades is low.

The principal conclusion I reach from a study of the moving averages technique is that, although they do not and cannot, predict a major turn in market price, they are able to assist producers to follow hedging strategies that over long periods of time increase overall profitability. Until data bases, econometric modelling and/or parameter estimation techniques are improved, moving averages have a role to play in hedging programs -- at least for some producers.

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