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ABSTRACT

Hedging strategies can assist cattle feeders in managing price risk. Confirmation of Helmuth's live cattle trade signal suggested it as a short hedging device. Seven technical hedging strategies, three emphasizing the trading technique suggested by Helmuth's work, were evaluated over three subperiods within the July 1974-December 1982 period. Four previously developed technical hedging strategies were evaluated monthly from 1975 to 1982. Findings suggest that the fundamentals incorporated in the Helmuth technique resulted in a trading strategy superior to the purely technical strategies. Further, this research indicates that technical hedging strategies proposed through previous research were of limited usefulness ex ante.

INTRODUCTION

Cattle feeders have faced price risk for decades. As a result of volatility in the feed grain sector, the cyclical liquidation of cattle and cyclical hog prices, variability in cash cattle prices has increased dramatically since 1972 (Purcell and Riffe, p. 85). While price risk and narrower cattle feeding profit margins have stimulated greater interest in hedging on the live cattle futures market, no more than 12 percent of fat cattle were hedged near the top one-third range of seasonal prices each year during 1977-81 (Kruse, p. 16). Better understanding of the futures market and hedging strategies should improve cattle feeders' risk management.

Several studies have reported success with cattle feeding hedging strategies based on moving averages and filtering techniques. Purcell and Riffe found a 4-day weighted, 5-day, and 15-day moving average combination successfully signaling short hedges for fed cattle during the feeding period from 1965 to 1977.[1] Shafer, Griffin and Johnstons' simulated short cattle hedges triggered by a 10- and 15-day moving average combination (and filter devices) over both a two-month planning period and the feeding period accompanied by long corn and feeder cattle hedges set during the two-month planning period by moving average combinations and filter devices were profitable versus cash marketing. Although not tested as a hedging strategy, Franzmann and Shields used the Box Complex procedure to determine that a 2-day weighted, 7-day, and 13-day moving average combination (plus a $.13/cwt. penetration rule) yielded the highest average profit per trade and fewest trades of all live cattle futures

trading techniques tested over the 1975-79 period.[2] Gorman and colleagues use of 3- and 10-day moving averages to set and lift initial short hedges during the feed-outs reduced cash market losses by 50 percent from 1971 to 1977.

Studies using moving averages such as those above have at least two major limitations; i.e., little or no theoretical foundation and no testing beyond the period from which they were developed. It is not known why the moving average strategies work and whether they perform well beyond the period from which they were developed. A policy issue relating to moving averages involves the efficient market hypothesis (EMH). Presumably, moving average indicators would not be successful if futures price changes were of the "efficient market" variety. That is, no systematic routine should be able to consistently generate profits if futures market price changes are random. This efficient market condition probably holds beyond some lead period of unknown length. However, short of that lead, certain technical indicators such as moving averages have, ex post, generated profits significantly greater than a naive buy (or sell) and hold strategy. Questions regarding moving averages' weak theoretical support and their performance beyond the period from which they were developed as well as implications for the EMH remain.

Other studies of the live cattle futures market have dealt directly with the market efficiency question (Bullock et al., Ehrich, Leuthold 1972, Leuthold 1974, Leuthold and Hartmann, Martin and Garcia, Purcell et al. 1980). The possibility of a bias in cattle futures price, has been addressed over the past decade (Haverkamp,

Heifner, Huszar and Walters, Kolb and Gay, Koppenhaver). The possiblity of a bias and its effect on hedging led to three congressional investigations headed by Helmuth (Staff 1980a, Staff 1980b, Staff 1981). In the latter study, Helmuth found that the futures price dropped within a short period of time when the live cattle futures price equaled or exceeded the USDA reported Corn Belt cost of feeding plus a midwestern basis adjustment from January 1978 through January 1981 (Staff 1981). This phenomenon indicated drops in live cattle futures prices with 100-percent accuracy (Staff 1981). Helmuth (p. 347) interpreted this as evidence that the live cattle futures market was not efficient.[3]

Previous hedging studies, the Helmuth controversy and maintained interest in cattle hedging suggest three relevant research objectives: (1) evaluate the sensitivity of what shall be termed Helmuth's live cattle trading technique (HTT) to alternative conditions; (2) evaluate the performance of the four previously developed moving average strategies over the more recent 1975-82 period; and (3) synthesize new hedging strategies incorporating HTT. Some inferences are drawn on the EMH.

THE HELMUTH CONTROVERSY

Unlike moving average indicators, the HTT has at least a modest theoretical foundation since it defines a natural short hedging point.[4] In the congressional study headed by Helmuth, simulated trading by the HTT was successful each of 29 times that the futures price reached the basis adjusted cost of feeding during the 37th month period (Staff 1981). Having isolated this signal, Helmuth used addi-

tional information to suggest that 32 large traders made disproportionate profits with the HTT.

Helmuth's reports spawned special investigations by the Commodity Futures Trading Commission, the National Cattlemen's Association, and Palme and Graham. These studies were primarily concerned with the allegation that 32 traders had acted in concert and less with the technique (CFTC 1982a, CFTC 1982b, NCA 1982, Palme and Graham). However, Palme and Graham offered three methodological criticisms of the HTT; i.e., use of revised USDA data rather than currently available data, inappropriate basis adjustment, and a test period which was too brief.

In light of the questioned validity of Helmuth's discovery, the HTT was reevaluated using unrevised USDA reported breakeven prices, two sets of bases, and two closing rules over three time periods spanning July 1974 through December 1982. If the HTT consistently yields significant trading profits under these alternatives, it could be considered robust, possibly useful as a short hedging tool, and modest evidence of an inefficient market.

Evaluating HTT

Four alternatives determined from two basis adjustments and two closing rules were applied to unrevised breakeven prices to evaluate HTT's sensitivity in determining profitable trades.

Method 1. 1968-78 Basis Adjustments, Day or Overnight Trades

Method 2. 1968-78 Basis Adjustments, Overnight Trades Required

Method 3. 1972-81 Basis Adjustments, Day or Overnight Trades

Method 4. 1972-81 Basis Adjustments, Overnight Trades Required

Data were unrevised breakeven selling prices per hundredweight required by Corn Belt cattle feeders to cover all costs (USDA 1974-80, USDA 1981-82, USDA 1981-83) and the average 1968-78 Interior Iowa-Southern Minnesota and 1972-81 Interior Iowa basis adjustments, Table 1 (Skadberg). The HTT established a short position once the daily high live cattle futures price equalled or exceeded the signal value consisting of the unrevised USDA reported Corn Belt cost of feeding per hundredweight plus a basis adjustment (Helmuth). The short position was offset when the daily closing price dropped below the signal level. The closing rule used by Helmuth (Methods 1 and 3) allowed a trade to be offset whenever the daily close declined below the signal level, i.e., a day or overnight trade. The alternative closing rule, adopted here as a sensitivity test, for Methods 2 and 4 required at least overnight presence in the market. Each of the four versions were simulated over the 8.5-year period July 1974 through December 1982 providing 102 cattle placement months.[5] This period encompasses the January 1978-January 1981 period used by Helmuth as well as 42 months before and 23 months after. Weak-form market efficiency for each of the three periods was evaluated by testing the hypothesis that mean gross profit per trade during the period was zero (Peterson and Leuthold).

Sensitivity of the HTT

The HTT provided positive mean gross profits for all four methods but only during the January 1978 to January 1981 period, the time span used by Helmuth (Table 2).[6] Only three (Method 1) to five (Method 2) of the 65 trades signaled in each method were losers but

Table 1. Average 1968-78 Interior Iowa-Southern Minnesota and Average 1972-81 Interior Iowa Basis Adjustments for Specific Placement Months and Live Cattle Futures Contracts.

Placement Month	Futures Contract	Interior Iowa-Southern Minnesota Average 1968-78 Basis Adjustment	Interior Iowa Average 1972-81 Basis Adjustment
Jan.	Jun.	$.36	$.70
Feb.	Aug.	.36	-.08
Mar.	Aug.	.56	.61
Apr.	Oct.	-.41	.00
May	Oct.	.55	.49
Jun.	Dec.	.97	1.85
Jul.	Dec.	1.23	1.19
Aug.	Feb.	.85	.99
Sep.	Feb.	.68	.67
Oct.	Apr.	1.22	1.42
Nov.	Apr.	.98	1.17
Dec.	Jun.	.77	1.00

Source: Skadberg.

Table 2. Comparison of the Mean-Variance Results From Four Methods Based on the Helmuth Trading Technique Using the Unrevised Per Hundredweight Breakeven Selling Prices, 102 Placement Periods, July 1974 to December 1982.

Placement Months	Criterion	Measure	Trading Results Method 1	Method 2	Method 3	Method 4
Jul.,1974-						
Dec.,1977	Trades	Number[a]	24(23,1)/42	24(22,2)/42	24(22,2)/42	24(22,2)/42
	Gross Profit[b]	Mean	-7.00	-70.50	-149.50	-95.83
		S. D.[c]	114.21	149.93	140.97	144.25
		Range	(-3440.00,316.00)	(-3440.00,708.00)	(-3360.00,296.00)	(-3360.00,564.00)
	Days Traded	Mean	4.79	8.04	6.67	8.33
		S. D.[c]	8.69	11.16	11.33	11.33
		Range	(1,42)	(2,42)	(1,42)	(2,42)
Jan.,1978-						
Jan.,1981	Trades	Number[a]	32(32,0)/37	32(32,0)/37	32(32,0)/37	32(32,0)/37
	Gross Profit[b]	Mean	289.13****	337.25****	292.88****	342.38****
		S. D.[c]	43.66	40.07	45.45	46.65
		Range	(12.00,1012.00)	(32.00,1012.00)	(28.00,1148.00)	(20.00,1148.00)
	Days Traded	Mean	2.09	2.78	2.03	2.91
		S. D.[c]	1.55	1.26	1.58	1.51
		Range	(1,7)	(2,7)	(1,7)	(2,7)
Feb.,1981-						
Dec.,1982	Trades	Number[a]	9(7,2)/23	9(6,3)/23	9(7,2)/23	9(7,2)/23
	Gross Profit[b]	Mean	-313.33	-417.33	-330.22	-300.89
		S. D.[c]	218.87	224.14	188.59	192.60
		Range	(-2952.00,256.00)	(-2952.00,296.00)	(-2560.00,140.00)	(-2560.00,320.00)
	Days Traded	Mean	7.44	10.22	7.33	8.44
		S. D.[c]	12.04	12.12	10.31	9.63
		Range	(1,35)	(2,35)	(1,29)	(2,29)
Jul.,1974-						
Dec.,1982	Trades	Number[a]	65(62,3)/102	65(60,5)/102	65(61,4)/102	65(61,4)/102
	Gross Profit[b]	Mean	96.37	82.22	43.26	91.51
		S. D.[c]	63.78	75.98	70.28	71.81
		Range	(-3440.00,1012.00)	(-3440.00,1012.00)	(-3360.00,1148.00)	(-3360.00,1148.00)
	Days Traded	Mean	3.83	5.75	4.48	5.68
		S. D.[c]	7.08	8.55	8.16	8.15
		Range	(1,42)	(2,42)	(1,42)	(2,42)

[a]Actual number of trades that were triggered. Numbers in parentheses indicate the number of trades producing positive and negative gross profits, respectively. / Potential number of trades that could have been triggered.

[b]Gross profit is on a dollars per trade basis. Mean gross profit level of significance indicated by * = 10%, ** = 5%, *** = 1%, **** = .1%.

[c]Standard Deviation of mean.

these losses were sufficient to provide negative mean gross profits during the periods before and after the January 1978 through January 1981 period. Significantly higher average gross profits during the Helmuth study period may have been because the cattle cycle was in the deceleration stage in 1978 and the turnaround stage in 1979-81 (USDA 1983). Therefore, relatively good live cattle futures prices triggered each HTT version frequently enough to produce significant gross profits.[7]

Thus, HTT's viability under alternative treatments appears to validate Helmuth's price signal phenomenon, at least during the period he used. Further, HTT's viability suggests it as a possible hedging tool and modest evidence of weak-form market inefficiency.

EVALUATING HEDGING STRATEGIES

Previous hedging strategies as well as the hedging strategies integrating HTT synthesized herein were evaluated for 96 feed-outs from 1975 through 1982. For each of the 96 monthly marketings, a pen of 200 630-pound feeder steers was purchased and placed on feed 168 days prior to the marketing.[8] Feed sufficient to feed out the pen was purchased at time of placement. Cash prices for feeder cattle, fat cattle, all feed ingredients, and all other costs are from the Great Plains Custom Cattle Feeding Tables (USDA 1974-80, USDA 1981-82, USDA 1981-83).

Chicago Mercantile Exchange live cattle and feeder cattle futures prices and Chicago Board of Trade corn futures prices were used. Standard commissions and interest expenses were included. Hedges were placed in futures contracts expiring as soon as possible

after the sale of the fat cattle.

Eight marketing strategies were evaluated over the 1975-82 period:

1. Cash Market Operation
2. Purcell and Riffe Hedging Strategy (1965-77)
3. Shafer et al. Integrated Hedging Strategy (1972-76)
4. Franzmann and Shields Hedging Strategy (1975-79)
5. Gorman et al. Hedging Strategy (1971-77)
6. Helmuth Hedging Strategy
7. Synthesized 32-Week Integrated Hedging Strategy
8. Synthesized 50-Week Integrated Hedging Strategy

The naive Cash Market Operation was used for comparison. Strategies 2-5 based on moving averages and filter devices from the studies discussed earlier essentially received an out-of-sample test. Strategy 6 is the HTT using the 1968-78 basis adjustments and the closing rule allowing day or overnight trades. Strategy 7 was designed to protect against (1) input cost increases over a two-month planning period and (2) output price declines over that same two-month period plus a 24-week feeding period. Feeder cattle and corn hedging strategies, as discussed in the Shafer et al. Integrated Hedging Strategy, were used to protect against input price increases. The Franzmann-Shields Hedging Strategy and the HTT were used together to protect against a decline in fed cattle prices.[9] Strategy 8 is equivalent to Strategy 7 with the planning period for both inputs and fed cattle lengthened to six months. Unfortunately, strategies 6, 7, and 8 are tested only within sample.

Mean-variance analysis for both (1) average per head return over only feed and feeder costs, and (2) average per head profit above all costs was used to gauge the performance of the various strategies. The performance of each hedging strategy was statistically tested against the cash marketing alternative. Hedging strategies which increased per head profitability without jointly increasing the variance or which decreased the variance without decreasing the mean per head profitability are preferred.

Performance of Previous Strategies

The Cash Market Operation yielded an average per head return above feed and feeder costs of $25.52 (profit above all costs of $-37.33) for the 96 pens over the eight-year period (Table 3). The cattle feeder would have faced a substantial number of unprofitable pens and extended periods of negative feeding margins during the January 1975 - December 1982 period.

Only one of the four previously developed hedging strategies proved superior to the cash marketing alternative over the entire eight-year period (Table 3). The Franzmann and Shields Hedging Strategy both increased per head profitability by $7.35 and reduced profitability variation by 18 to 20 percent (both significant at the 95-percent confidence level). Profitability was increased or the variance was reduced in each of the eight years analyzed. Another positive feature was the signaling of only 1.08 hedges per pen with 54 percent profitable.

The Purcell and Riffe Hedging Strategy reduced profit variability, but per head profitability was $4.19 less than the Cash Market

Operation over the 1975-82 period. The Shafer et al. Integrated Hedging Strategy's per head profitability was $4.15 less than the cash marketing alternative and the variance was greater. However, long hedges for feeder cattle and corn added minute amounts to per head profitability. The Gorman et al. Hedging Strategy had minor impact on cattle feeding profitability. Only six hedges were triggered over the eight-year period due to the high profit targets; three were unprofitable. Thus, three of the four previously successful hedging strategies did not fare well when tested beyond the time spans from which they were developed. The Franzemann and Shield's strategy was developed over the most recent period, 1975-79, which may account for some of its success.

Performance of New Strategies

Hedging strategies composed of elements of previously successful strategies and the HTT proved profitable relative to the cash marketing alternative (Table 3). The Synthesized 50-Week Integrated Hedging Strategy (combining Strategies 3, 4, and 6) produced the highest mean per head profitability over that of cash marketing; $16.09, significant at the 99-percent confidence level. Profitability was enhanced in five of the eight years studied and the variance was decreased in four years. However, only 51 percent of the 606 hedges triggered over 1975-82 were profitable.

The Synthesized 32-Week Integrated Hedging Strategy was $11.50 more profitable per head than was the Cash Market Operation, significant at the 95-percent confidence level. Profitability variance was 12 to 13 percent lower than that of cash marketing, significant at

Table 3. Overall Eight Year Comparison of the Mean-Variance Results Among Eight Marketing Strategies, 96 Pens, Texas High Plains, 1975-82.

Strategy	Return Per Head Above Feed and Feeder Costs				Profit Per Head Above All Costs			
	Mean	Standard Error Mean	C. V.[a]	Range	Mean	Standard Error Mean	C. V.[a]	Range
1 Cash Marketing Operation	$25.52	$6.88	264.12	($-91.24,$194.41)	$-37.33	$7.18	-188.46	($-169.91,$134.32)
2 Purcell and Riffe Hedging	21.33	6.21	285.34	(-93.52,183.18)	-41.52	6.59	-155.64	(-173.99,132.60)
3 Shafer et al. Integrated Hedging	21.37	7.49	343.85	(-123.29,207.78)	-41.48	7.84	-185.21	(-203.65,148.75)
4 Franzmann and Shields Hedging	32.87	5.65	168.42	(-77.77,178.25)	-29.98	5.72	-187.20	(-147.68,102.64)
5 Gorman et al. Hedging	25.79	6.95	264.12	(-91.24,200.46)	-37.06	7.27	-192.35	(-169.91,156.22)
6 Helmuth Hedging	27.02	6.84	248.27	(-87.99,206.46)	-35.83	7.12	-194.77	(-167.46,146.37)
7 Synthesized 32-Week Integrated Hedging	37.02	6.08	160.92	(-98.18,224.51)	-25.83	6.25	-237.10	(-178.55,148.90)
8 Synthesized 50-Week Integrated Hedging	41.61	6.51	153.31	(-140.76,269.49)	-21.24	6.99	-322.70	(-221.12,223.77)

[a]Coefficient of Variation = (Standard Deviation + Mean) x 100.

the 90-percent confidence level. Profitability increased in six years whereas the variance decreased in four years. In addition, 56 percent of the 344 trades triggered were profitable.

The Helmuth Hedging Strategy (based on the HTT) triggered 61 hedges of which 80 percent were profitable. Profitability was enhanced in six years and the variance was decreased in four years. Mean per head profitability exceeded that of the Cash Market Operation by only $1.50, significant at the 90-percent confidence level. Again, we see that profitable hedging strategies can be developed ex post.

SUMMARY AND CONCLUSIONS

This study documents that each of four versions of the HTT, using unrevised prices differentiated by basis adjustments and closing rules, could have generated statistically significant gross profits in live cattle futures over the original Helmuth test period, i.e., January 1978-January 1981.[10] Restricting each of the HTT versions by simply eliminating trading in April futures contracts 90 days after the first of the placement month (October or November) resulted in statistically significant gross profits in all three placement periods; i.e., the entire 1974-82 time span. Between 54 and 64 percent (depending on the version) of the futures prices over that 8.5-year period reached the level where the HTT was triggered.[11] Ninety-two to 100 (72 to 92) percent of the trades were profitable in terms of gross (net) profit.[12]

Since the HTT resulted in significant profits for both the unrestricted (1978-81) and restricted (1974-82) versions, it can be

inferred that the live cattle futures market was not entirely weak-form efficient for the respective periods (Peterson and Leuthold).

The weak-form market inefficiency detected here would seem to have a reasonable explanation. When the live cattle futures price approaches the HTT trigger level, informed traders presumably know that the market psychology variance is reduced because cattle feeders are likely to attempt to "lock-in" profits by short hedging. Traders take advantage of this natural short hedging situation by selling futures. They profit a significant percentage of the time because of price drops associated with the bearish attitude. The HTT was based on economic rationale and a less than fully informed group of traders. While evaluating the EMH was not a primary objective here, the results fuel the debate. Kolb and Gay find "no evidence of any significant bias in live cattle futures prices", but Koppenhaver reported that "...futures prices are systematically biased downward..." due to a risk premium. Irwin and Uhrig found significant returns to various trading systems applied to futures prices and rejected futures market efficiency for the 1960-1983 period. HTT, based not on a technical system but rather on economic criteria, was perhaps more difficult to detect by methods such as Kolb and Gays'. HTT appears to have been one of those "exploitable 'pockets of inefficiency' in the market" (Seligman, p. 88).

An important policy question is whether cattle feeders would be better off without live cattle futures? This study infers that certain ex post hedging strategies could have increased and stabilized cattle feeding profitability compared to cash marketing. These

results suggest that futures markets may provide a useful price risk management alternative. However, whether cattle feeding would have been more profitable in the absence of futures markets is not known. The possibility that the live cattle futures market may exert a downward pressure on cash prices due to the natural short trading phenomenon illustrated by the HTT was not examined.

In spite of the risk management potential of the futures market, evaluating previous hedging strategies suggests a low probability of continued success for any given strategy. The strategies developed by Purcell and Riffe, Shafer et al., and Gorman et al. did not perform well in a later time period. Clearly, a successful hedging strategy must be continually updated and revised to improve the probability of profitability. Franzmann and Shields, by refining Merrill Lynch's 7- and 13-day moving average combination (the most consistent live cattle futures price indicator over the 1970-76 period), produced the highest average per trade profit over the 1975-79 period. Franzmann and Shields' strategy also yielded the highest profit over the 1975-82 period.

While certain ex post moving average strategies have performed well, how would users know (ex ante) whether those strategies will be profitable hedging indicators? Since moving averages have no theoretical foundation, how can cattle feeders have confidence in such devices helping to solve the problem of price risk? In contrast, the HTT, which has theoretical support, may continue to be useful to cattle feeders provided the market remains sufficiently uninformed, i.e., inefficient. Reversing the typical good news, bad news para-

digm; the bad news is the market appears to be short-run weak-form inefficient because trading techniques produce significant gains ex post; the good news is it does not seem to matter a great deal due to the low ex ante expectations. Such is the case in much of economic forecasting (Hutchinson).

FOOTNOTES

[1] In a separate study of short trades only, Purcell found that the same moving average combination produced the largest cumulative net profit, the highest average profit per trade, and the lowest number of trades when testing four strategies from 1965 to 1976.

[2] Earlier, Merrill Lynch published results showing the 7- and 13-day moving average crossover model to be the most consistent indicator of all computerized live cattle future trading techniques over the 1970-76 period in terms of cumulative net profit, smallest string of losses, and percentage of profitable trades.

[3] According to the theory of efficient markets, based on the concept of perfect competition and the conclusion that price changes in an efficient market follow a random walk, it is not possible to discover any mechanical trading technique which predicts futures price changes with accuracy if the market is operating efficiently (Helmuth, p. 347, Mann and Heifner).

[4] Contrary to criticism (NCA 1982), HTT's use of a natural short hedging point where the localized futures price at least covers Corn Belt breakeven costs of cattle feeding seems to have theoretical merit. Short hedging would be expected at breakeven prices, leading to a price drop given enough short trades and uninformed long trad-

ers.

[5] The monthly average USDA breakeven Corn Belt selling prices used in the HTT are distinguishable by cattle placement months. To stay current between the quarterly issues of the *Livestock and Poultry Outlook and Situation,* a trader would need to substitute 20-day moving averages of current cash feeder cattle and corn prices available in the *Wall Street Journal* in calculating the most recently published placement month's breakeven selling price. The one transaction allowed per placement month had to occur between the first trading day of the placement month and the last trading day previous to the delivery month.

[6] Since the HTT yielded essentially the same results whether based on unrevised or revised USDA price data, only the unrevised price based technique results are reported here (Pluhar).

[7] Each of the three to five losing trades generated by the HTT were associated with April contract trades opened after 90 days. It is theorized that the losing trades occurred in a consistent pattern due to the seasonality of live cattle prices. Seasonality literature suggests price usually moves upward from January through April (Kluis et al., Merrill Lynch et al. 1980, NCA 1983, ContiCommodity). Adding only the restriction that trading could not occur in the April futures contract 90 days after the first of the placement month (October or November) eliminated all losing trades and yielded statistically significant mean gross profits for all four methods in each of the three periods.

[8] Assuming a conversion ratio of 8.4:1 and an average daily rate of

gain of 2.8 pounds, the cattle would be fed 168 days to reach 1100-pound slaughter steers. After a 4-percent pencil shrink, the cattle would be marketed at 1056 pounds.

[9] These two strategies were complimentary because their hedged positions did not occur simultaneously. The Franzmann and Shields strategy helped guard against long-term price declines whereas the HTT defended against very short-term price declines.

[10] The present study could be criticized (as was Helmuth's) for simulating results from a technique using average bases calculated from information not completely available at the beginning of the study period (Palme and Graham). However, the similarity of results between basis adjustments suggests the HTT was somewhat insensitive to bases. This is because the bases are relatively small compared with the per hundredweight breakeven prices they adjust (0 to 3 percent).

[11] Multiplying the percentage of placement months when a trading technique was signaled by the percent of months generating a net profit indicates the proportion of months the technique was profitable. The HTT was profitable 46 to 53 percent of the time while the most profitable live cattle futures trading technique of those studied (Franzmann-Shields) produced a percentage of 48.

[12] It may be argued that the HTT is losing its significance, as Helmuth believed it would (Staff 1981), since only nine trades were signaled in the 1981-82 period. This infrequency was probably due to the stage of the cattle cycle. The HTT, especially the restricted versions, will likely once more be profitable as the cattle cycle

progresses.

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