A TECHNICAL MARKETING STRATEGY USING WEEKLY AVERAGE CASH PRICES OF SLAUGHTER CATTLE FOR USE BY CONTINUOUS FEEDLOTS

By

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PREFACE

At this time, I would like to acknowledge those who made this thesis possible for me to complete.

I am grateful for the financial assistance I received from the Agricultural Economics Department at Oklahoma State University, for without the assistantship my graduate study would have been impossible.

I sincerely appreciate Dr. John R. Franzmann, my major advisor, for his patience, sound advice, constant support, and friendship during my Masters program. I would also like to thank my committee members, Dr. Leo V. Blakley and Dr. James N. Trapp, for their helpful suggestions and class instructions. A special thanks is given to Dr. Clement E. Ward for allowing me to use his USDA "Livestock Meat and Wool" reports. I deeply appreciate the friendship and encouragement I received from Dr. Joseph E. Williams.

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To my lovely wife, Dana, whose constant love and support enabled me to survive these last two years. To her, this thesis is devoted. And to our families whose love and encouragement enabled both of us to complete our degrees.

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CHAPTER I

INTRODUCTION

For many years, the largest sector of Oklahoma's agriculture has been the livestock industry and within the livestock industry, cattle have been the largest share of Oklahoma's production. The revenues generated from cattle production have been extremely unstable with some years resulting in profits and other years in substantial losses during the past decade. Due to several unprofitable years in the recent decade, cattlemen have become increasingly aware that their risk-taking ability depends directly upon their profits.

Profits are the rewards for taking risks.[1] Unfortunately many cattlemen have encountered few rewards compared to the astronomical risks they have taken. As such, in Oklahoma and all across the United States, cattlemen have been forced to terminate cattle production because of financial difficulties.

Almost all financial difficulties can be linked to two types of risks: financial and business. Financial risks pertain to the degree to which the firm has been leveraged (debt financed). When financial risks become burdensome usually a "wrong" business decision has been

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[1] John Ikerd and Francis Epplin. "Livestock Decision Risk Analysis." OSU Current Report CR-310, February 1983.

made at an earlier date. Business risk is the chance of a negative outcome from a business decision. Two categories of business risks are production risks and market risks. Production risks relate to any adverse effects causing unfavorable production costs such as weather, higher feed costs, etc.[2] As such, production risks would merely raise the breakeven price and thus would not be a candidate for causing a firm to become severely overleveraged. So the major concern with regard to management of risks is market risks.

Market risks result from the probability of an adverse movement of prices. For some firms, one severe adverse movement of prices could financially ruin the firm. Because of the large market risks, agricultural economists have suggested using forward contracting or the futures market to reduce market risks.

Forward contracts can be difficult to arrange (e.g. time-consuming, requiring many negotiations, and virtually an irreversible decision) and therefore their ability to offset market risks is diminished. As for the futures market, many cattle producers have become extremely disenchanted with the prospects of hedging.[3] The disenchantment stems from the producers' lack of understanding and experience with the futures market. Some cattlemen do not understand that the futures market is principally a risk adversion technique and not necessarily a place to make profits with respect to hedging. So

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[2]Ikerd and Epplin, p.310.1.

[3]Hedging is the process of taking an equal but opposite position in the futures market than what a person has in the cash markets.

when producers are told that the futures market is not a profit making venture for the hedger, they simply avoid using the futures market. Thus, many cattlemen are continuing to bear all the market risks and the problem of when to buy or sell cattle in the cash markets remains a major concern.

The Problem

Violent fluctuations in cattle prices have caused a drastic increase in risk faced by cattlemen in the United States during the past decade. During a five-month period in 1979, the Omaha weekly average cash price for 900-1100 pound Choice steers dropped from $77.00/cwt (hundredweight) on April 21 to $58.28/cwt by August 11 and then rose to $68.82/cwt by September 22. The total change in price was $29.26/cwt or roughly $300 per head, and since 1972 there have been sixteen occasions when the weekly average price has changed at least $10/cwt within a 6-month period. Consequently to obtain the most favorable price in the face of such instability, cattlemen need to make timely marketing decisions.

Timely marketing decisions can only be enacted with a sufficient amount of market information. However, what is considered sufficient information for one producer may not be sufficient for another producer. Therefore, the need for an objective marketing strategy using readily available information to aid cattlemen in making their timely marketing decisions becomes apparent.

Objectives

The primary objective of this thesis is to establish objective rules for buying and selling cattle in the cash markets.

The specific objectives include:

1. To develop a set of moving averages using average cash prices over the past decade that would maximize returns to producers.

2. To determine if an optimized set of moving averages used in conjunction with a Relative Strength Index (RSI) would further increase profits and reduce profit variability compared to a fixed period strategy of marketing slaughter cattle.

Literature Review

Although a number of studies has been conducted concerning the use of an optimized moving average and the validity of RSI, all results known to the author were conducted in the futures market and not in the cash market. Thus, this review is centered upon the conceptual uses and results of the respective technical tools.

The Role of Moving Averages for Effective Timing of Purchases and Sales

Lehenbauer (1978) optimized moving averages and point-and-figure parameters in terms of net profit for feeder cattle in the futures market. His primary goal was profit maximization with a secondary goal of risk reduction. Lehenbauer found that technical tools definitely increased net profits while at the same time lowering risks. He predicted that cattle prices would continue to be very

volatile. Lehenbauer also forewarned of financial disaster if unsound marketing practices were followed.

Hochheimer (1978) for Merrill Lynch studied the optimization of simple moving averages, exponential moving averages, and linearly weighted moving averages for several commodities, including cattle, in the futures market. He determined that the simple moving average worked better than either the linearly weighted or exponential average. However, He concluded that moving averages were very susceptible to large strings of losses and as such the person using moving averages would have to psychologically cope with the losses. He stated that in order for technical tools to be of any advantage, the person that used the tools must be a well disciplined trader.

Corballis (1980) presented a pamphlet for Thomson McKinnon which discussed various types of technical analysis, including moving averages. He gave a brief overview as follows:

> Moving averages are part of the technician's basic tools for determining price trend. The purpose of the moving average is to smooth prices in such a way that the overall directional movement becomes apparent (p.6).

His results suggested that the length of the moving average was far more important than the method of calculation, i.e. simple versus linearly weighted.

Shields (1980) optimized moving averages for feeder cattle, live cattle, and corn with a direct search technique called the Box Complex Procedure. He found that multiple hedging could potentially increase profits and reduce price variability for a continuous feedlot

operation.[4] He concluded that other technical tools, besides moving averages, could help producers decide when to buy or sell.

Ikerd (1982) mentioned that determining the length of moving averages to use involved an important trade-off. He stated that the shorter the length and the smaller the differences of averages used, the greater the number of trade signals that would be generated, thus lowering the profit per trade. If a longer set of moving averages are used, Ikerd argued, whipsaw losses would be reduced at the expense of perhaps a substantial price movement before trade signals were generated.

Franzmann and Sronce (1983) optimized moving averages for multiple hedging programs for hogs. They used the Box Complex Procedure to optimize the moving averages and then tried to reoptimize the moving averages over selected intervals. They concluded that profits generated from the reoptimizing programs were less than a single set of optimized moving average over the entire test period.

The Role of Relative Strength Index for Determining Overbought and Oversold Situations

Wilder (1978) introduced a special momentum oscillator which not only would calculate the velocity of directional price movement, but also had a definite range of 0 to 100, unlike all other oscillators. The new tool was named Relative Strength Index. RSI allowed traders,

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[4]Multiple hedging involves hedging the same commodity more than once with the idea of reducing losses in uptrending markets.

according to Wilder, to overcome three problems of other oscillators; namely, 1) erratic movement within oscillator configuration, 2) the scale to use for the "Y" axis, and 3) necessity of having to handle enormous amounts of data. He showed the necessary calculations for deriving RSI and stated that tops and bottoms of prices were predicted when RSI went above 70 or below 30 respectively. Wilder concluded that RSI should be used in conjunction with other technical tools.

Minor (1978) explained Wilder's RSI concept with mathematics. He stated that mathematics proved that RSI values should increase (decrease) on days that the price closed above (below) the previous trading day. Minor suggested that RSI signaled a trend reversal when a value of 50 was crossed from either direction. He agreed with Wilder that no single tool was correct 100 percent of the time and, as such, the RSI should be used with other tools.

Minor (1980) looked at various lengths of RSI calculations, in particular 9-day and 25-day calculation period. He concluded that length was important, but that the 14-day calculation as suggested by Wilder appeared to work best. Minor noted that the index did not perform well with sudden increases in market volatility and that divergence was more likely to appear in shorter calculation lengths.[5]

Schlobohm (1982) provided a "quick-fire" way to calculate RSI. Although the values were not the same as those when using the conventional methods for calculating RSI, he found that his method was

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[5] Divergence occurs when prices and RSI values are simultaneously trending in opposite directions, i.e. prices trending up and RSI values trending down and vice-versa.

close enough to give a trader an indication of whether or not the market was overbought or oversold. Schlobohm suggested that values of 25 to 35 indicated times to buy and values of 65 to 75 as possible selling points. He also pointed out that since RSI's introduction in 1978, the technical tool had become one of the most popular trading tools.

Franzmann (1983) presented a paper to the 19th Annual OSU Cattle Feeders' Seminar suggesting the use of RSI to choose times to hedge. He noted that in recent years live cattle futures prices tended to top or react to RSI values of 70 and to bottom or react to RSI values of 30. Franzmann showed the similarities between RSI and vertical line charts. He proceeded to talk about failure swings which indicate market reversal and divergence which indicates either market weakness or market strength depending upon price and RSI values. He also concluded that RSI used in conjunction with other technical tools could greatly aid producers in their marketing decisions.

CHAPTER II

THEORY OF MOVING AVERAGES AND RELATIVE STRENGTH INDEX AND PROCEDURE

People are constantly looking for advice concerning what the future will hold, and cattlemen are no different with respect to cattle prices. Unfortunately, no one is known to have a system which provides perfect forecasts of cattle prices. Since a perfect system has not been found, marketing specialists continue to search for better means to improve price forecasts.

Extensive price forecasting studies have been conducted in the futures market using technical analysis, based on past price trends, to determine when to buy or sell a futures contract. The studies concluded that technical analysis, although not perfect, could aid in the prediction of relative tops and bottoms of futures market prices. Although many cattle producers choose not to trade in the futures market, technical analysis may be as effective a market indicator in the cash market as in the futures market. If so, cattlemen may be able to improve their marketing decisions by applying technical analysis to cash prices.

The Moving Average Technique

Perhaps the most popular technical tool developed to date is the moving average. Calculation simplicity and potential price trend

prediction has pushed moving averages into popularity among traders in the stock market and futures market. Moving averages are used by some traders because of the complete objectivity of the tool.[1] Many technical tools require some subjectivity on the part of the trader. However, moving averages provide a precise date on which to buy or sell.

To calculate a moving average value requires only elementary arithmetic. This study is concerned with two of the more popular moving average schemes -- namely the simple moving average and the linearly weighted moving average. No doubt much of the popularity of the two named moving averages stems from their relatively easy calculation. The simple moving average, as the name implies, involves summing the most recent desired number of prices (e.g. closing price or average price, etc.) with the number being determined by the length of the moving average desired and then dividing by the length of the moving average. For example, a simple 6-day moving average would sum the six most recent days of prices and then would divide that sum by 6 to achieve the moving average for that day. The next day, the oldest price would be dropped and the newest price (the next day's price) would be summed with the remaining five days and then divided by 6 to receive the next day's moving average and continuing endlessly.

The linearly weighted moving average uses the same basic concept as the simple moving average, except the linear weighting puts more emphasis on the more recent prices. A weight of one is given to the

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[1] John Ikerd and John Franzmann, "Using Futures For Hedging: Multiple Hedging Livestock" OSU Extension Facts No. 444 (Stillwater, 1980), p.444.4.

oldest price, two is given to the next oldest price continuing up to the desired length of the moving average. The weighted prices are divided by the sum of the weights.[2]

A buy (sell) signal is generated when the smaller length moving average's value becomes greater (smaller) than the larger moving average's value. For example, if we were using a 3-day and a 10-day average a sell signal would be produced whenever the 3-day average had a value smaller than the 10-day average. Figure 1 presents a graphical illustration of the previously stated example.

A set of three moving averages can be used as illustrated in Figure 2 and discussed below. The intermediate and largest averages work the same as with a set of two averages except that the smallest average of the 3 confirms the buy and sell signals of the intermediate and largest averages. The third moving average was included to reduce the "whipsaw effects" of just two moving averages. The idea behind reducing the whipsaw effect is to keep the averages from switching back and forth during market consolidations (sideways movements) and thus resulting in numerous losses.

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[2]Illustration of calculating a 4-day linearly weighted moving average with n representing the most recent price.

Day	Price		Weight		Product
n	50.00	X	4	=	200.00
n-1	51.00	X	3	=	153.00
n-2	49.50	X	2	=	99.00
n-3	50.00	X	1	=	50.00
			10		502.00

The 4-day linearly weighted average is 502.00/10 = 50.20

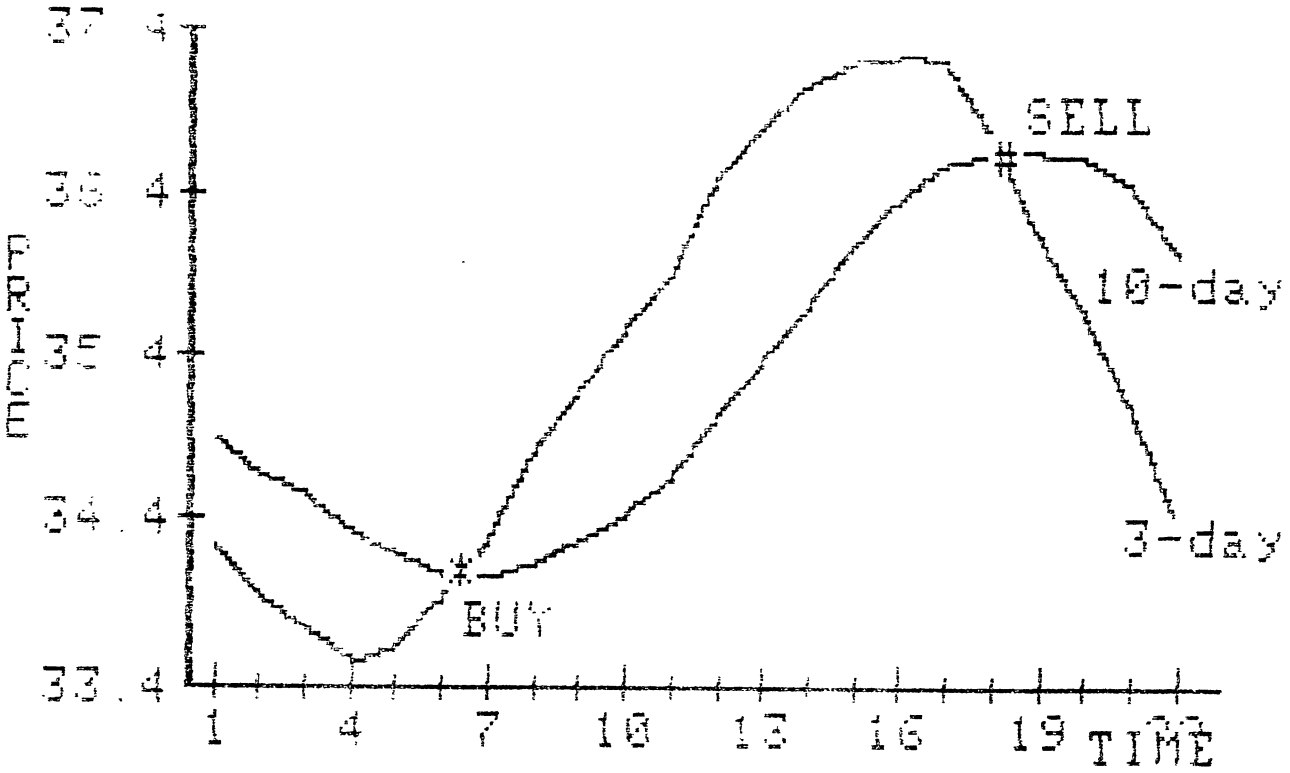

Figure 1. Trade Signals from Two Moving Averages

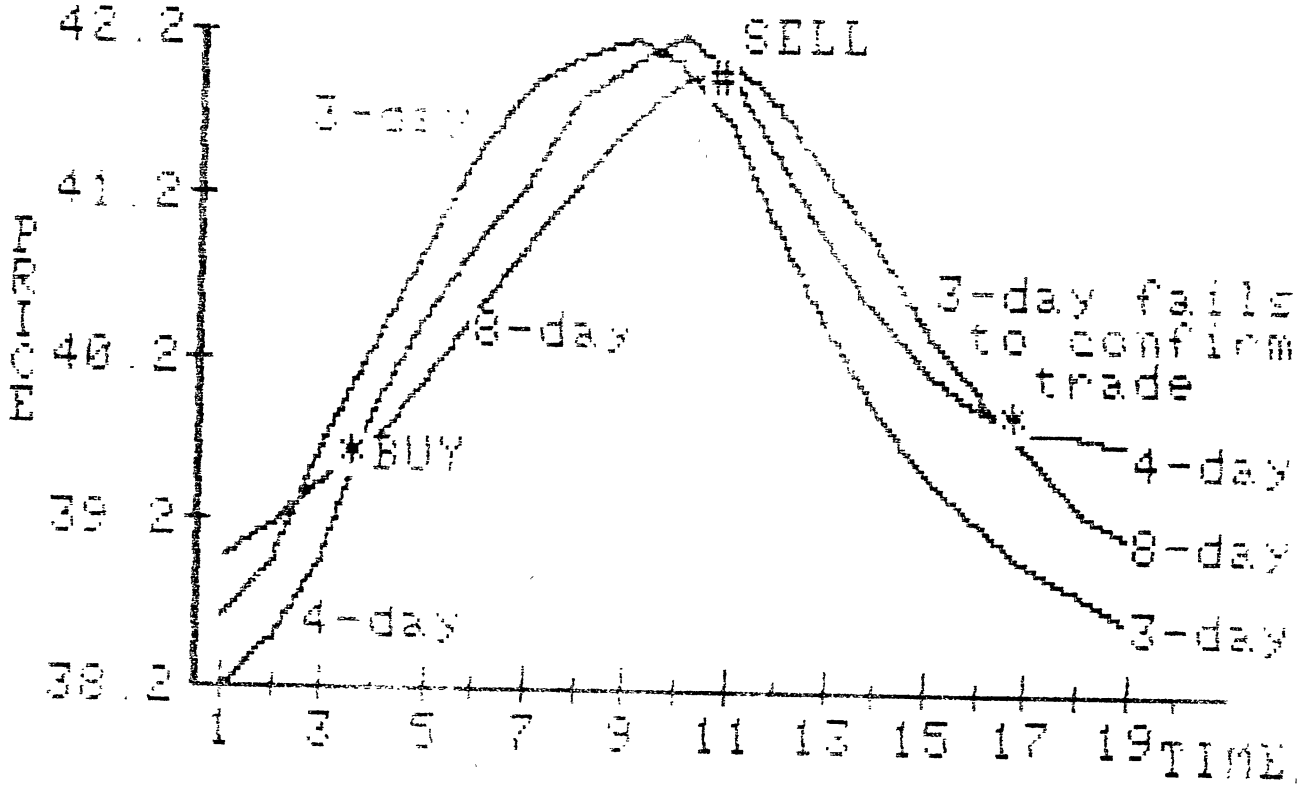

Figure 2. Trade Signals from Three Moving Averages

Another idea used in conjunction with moving averages to reduce whipsaws is the penetration rule.[3] The penetration rule, like the third moving average, reduces the number of unprofitable trades especially during consolidations. However, when one protects against consolidations, the signals for a top or a bottom are generated substantially later than without a penetration rule. Normally a penetration rule ranges from 0 cents to 20 cents per hundredweight for cattle in the futures market. If a trader used a set of two averages and a penetration rule of 5 cents per hundredweight, then buy signals would be given when the smaller average became greater than the larger average by at least 5 cents per hundredweight and conversely for a sell signal. With a set of three averages, the intermediate average would have to become at least 5 cents per hundredweight greater than the largest average with the smallest average confirming the buy signal (the smallest being greater than the intermediate average) in order to have a legitimate buy signal and once again conversely for a sell signal.

Regardless of whether a third moving average and/or a penetration rule is incorporated, moving averages work best in long trending markets. As mentioned earlier, the third moving average or penetration rule is used mainly for market consolidation detection and not for absolute bottoms or tops. Perhaps a tool that could predict relative bottoms and tops might enhance the profitability of a moving average scheme.

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[3] A penetration rule is a technique used to help alleviate whipsaw effects from a moving average strategy by requiring the signalling average to be at least greater (smaller) by the penetration rule than the longest average.

The Relative Strength Index Technique

The Relative Strength Index (RSI) is a momentum oscillator which measures the velocity of price movements. Unlike RSI's predecessors, RSI has a definite range of 0 to 100. The calculation of RSI, as with moving averages, involves simple arithmetic which is presented in the discussion that follows. Wilder, the developer of the RSI, suggests a formula of:

$$RSI = 100 - \frac{100}{1+RS}$$

where

$$RS = \frac{\text{average of 14 days closes up}}{\text{average of 14 days closes down}}$$

For convenience, Wilder provided a worksheet for calculating the RSI as can be seen in Table I. Column one was reserved for the date and column two was used for recording the desired price (closing price, settlement price, average price, etc.) for the respective dates. Column three was used to record positive differences between two consecutive days and column four was to record negative differences between two consecutive days. Column five contain the average up value for the 14-day period and column six contained the average down value for the same period. Column seven was the ratio of column five (average up) divided by column six (average down) which was the RS value from above. Column eight contained the ratio of 100 divided by column seven plus 1 and finally, column nine contained the value of 100 minus column 8 or the RSI value for that particular date.

TABLE I

RELATIVE STRENGTH WORKSHEET

Date (1)	Settle Price (2)	Up Change (3)	Down Change (4)	Up Average (5)	Down Average (6)	Ratio (5)÷(6) (7)	$\frac{100}{1+(7)}$ (8)	100-(8) (9)
7-13	62.05							
7-14	62.95	.90						
7-15	62.70		.25					
7-16	63.00	.30						
7-19	62.40		.60					
7-20	62.45	.05						
7-21	62.65	.20						
7-22	62.40		.25					
7-23	62.30		.10					
7-26	63.05	.75						
7-27	63.90	.85						
7-28	63.40		.50					
7-29	63.10		.30					
7-30	62.85		.25					
8-02	63.05	.20		.2321	.1607	1.4443	40.91	59.09
8-03	62.95		.10	.2155	.1564	1.3779	42.05	57.95
8-04	63.05	.10		.2073	.1452	1.4277	41.19	58.81
8-05	63.05	---	---	.1925	.1348	1.4277	41.19	58.81

Source: 19th Annual OSU Cattle Feeders' Seminar.

To update the RSI value for the next day, one would merely multiply the previous day's up average by 13 and add the current day's up value, if any, then divide by 14 to calculate the new up average. Next, repeat the same procedure for the down average to obtain the new down average. The remaining columns are calculated the same as mentioned above.

In the lower ranges of 0 to 35, RSI indicates the market is oversold which suggests that the price should increase. Figure 3 presents a graphical illustration of RSI and futures prices. Points I and II in Figure 3 both indicate that the market is in an oversold area and that the market price should increase, and, in fact, the market price did increase.

In the upper ranges of 65 to 100, RSI indicates that the market is in an overbought area which means the price should decline. In Figure 3, points A, B, and C have a RSI value above 65 suggesting that the price might fall which, indeed, the price did. However, the market did not stop its upward trend. A possible explanation for the RSI's detection of the overbought areas might be that the market was entering into a small correction move in order to continue the overall uptrend. However, note the larger drop in prices preceeding point II which the RSI's values did not predict as strongly as the other points of A, B, and C. This particular situation does not invalidate the RSI systems, but it merely shows us the limitations of the tool.

RSI predicts "relative" tops and bottoms and not necessarily the very top or very bottom of a market. Relative Strength Index does not enable a trader to predict where prices are going such as $60 per cwt, but instead whether prices might go up or down in the immediate

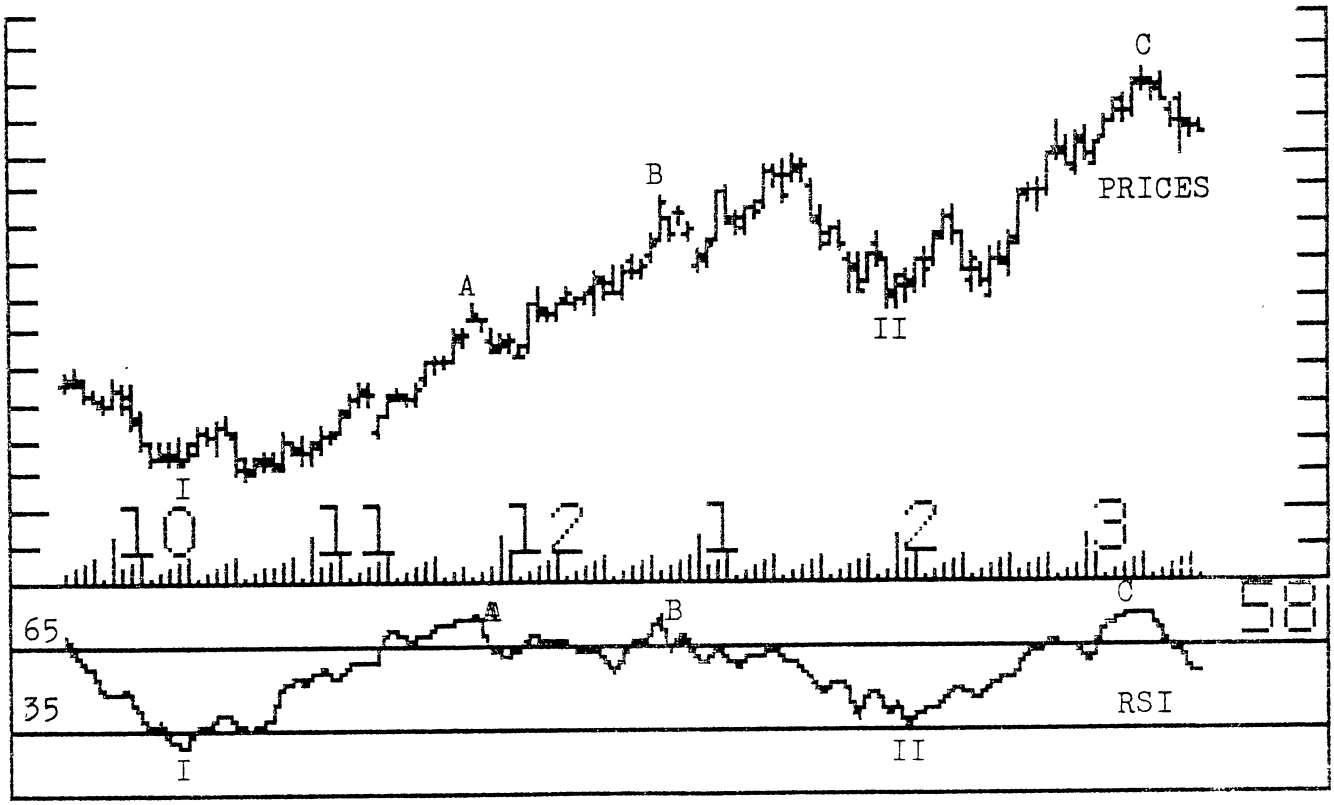

Figure 3. 1984 April Live Cattle Futures Contract Prices with RSI

future. A trader should note that RSI does not give a precise day in which to enter into the market. Hence, marketing strategies should not be based solely upon RSI.

Procedure

The length of the moving averages is optimized using weekly average cash prices quoted by USDA's "Livestock Meat and Wool" from 1972 to 1982 for Omaha Choice 2-4, 900-1100 pound steers; Omaha Choice 2-4, 900-1100 pound heifers; and Texas Panhandle Choice 2-4, 900-1100 pound steers. The optimization was evaluated in terms of profits generated from a set of buy and sell signals via the crossing of the moving averages.

A Relative Strength Index was calculated using the same data as the moving averages. The RSI value was used then as a confirming technique where buy signals generated by the moving averages were not honored when RSI was below 40. In addition an automatic sell was signalled whenever RSI reached 90 if the moving averages had not as yet indicated a sell signal. The RSI value was used in conjunction with the optimized moving averages to reduce the "whipsaw effects" resulting from the sole use of moving averages. Because the RSI value was not available until the fifteenth week of 1972, all trade signals generated by the moving averages before the fifteenth week of 1972 were not honored so that all trades could be confimed by a RSI value.

Summary

This chapter included a discussion on the two basic tools, namely moving averages and RSI, that will be used in conjunction with one and

another to form a cattle marketing strategy. Both the strengths and weaknesses of each tool were brought forth in an effort to better inform potential users of these technical tools. And lastly, the procedure used to develop the marketing strategy for this study was outlined.

CHAPTER III

SELECTION OF AN OPTIMUM MOVING AVERAGE PARAMETER IN CONJUNCTION WITH RELATIVE STRENGTH INDEX

Technical marketing strategies have been used extensively by stock market and futures market traders over the past decade. Many traders concluded that the effectiveness of technical tools have discounted the Theory of Random Walk. Random Walk suggests that price differences from one day to the next are purely random and follow no set pattern. However, since profitable trades have been generated using technical tools, this fact would support the idea that prices might follow some sort of a trend during a particular time interval and thus discount the Theory of Random Walk. Therefore, if price trends can be identified in the cattle futures market, it would seem only natural to be able to identify price trends in the cash markets for cattle and vice versa. This chapter will attempt to provide a technical marketing strategy which will present a viable prediction of price trends in the cash slaughter cattle markets.

The slaughter cattle market was chosen because of the seemingly lower price volatility compared with that of the stocker/feeder market. Perhaps one reason for the lower volatility could stem from the fewer alternatives a producer has with a 1100 pound animals compared with 500-600 pound animals. Specifically, the three markets

chosen for this study were Omaha Choice 2-4, 900-1100 pound steers; Omaha Choice 2-4, 900-1100 pound heifers; and Texas Choice 2-4, 900-1100 pound steers. These specific markets were chosen because they had a sufficient volume of cattle sales to be quoted in the USDA's weekly publication of "Livestock Meat and Wool". The prices quoted were the weekly average prices for the respective cash markets. Eleven years of data, specifically 1972-1982, for each of the three markets were used to calculate various moving averages in an attempt to find an optimum moving average. Eleven years of data were used to insure that a complete revolution of the cattle cycle had elapsed.[1] Although the marketing grades changed over the period from Choice to Choice 2-4, the animals slaughtered remained basically of the same quality.

The Moving Average and RSI Program

A moving average and RSI program for the Radio Shack microcomputer was developed at Oklahoma State University.[2] Unlike the Box Complex Procedure, the Radio Shack program simply calculates either a simple or linearly weighted moving averages and simultaneously an RSI value for a set of price data.[3] The lengths of the moving averages used are completely up to the discretion of the

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[1] John R. Franzmann, "Cattle Cycles Revisited", Southern Journal of Agricultural Economics, December 1971, pp.69-76.

[2] Aseem Das, a computer programmer assistant for the Agricultural Economics Department, was the creator of the program.

[3] The Box Complex Procedure is a direct search technique that finds the optimum moving averages for a set of price data.

user, however the RSI is fixed at a length of 14 because it is the most common length associated with RSI. The only drawback to the Radio Shack program is that the trader is required to search through the computer printouts to determine the times in which trade signals are generated.

Using the Moving Average Technique

An important assumption should be noted here. A major assumption in this moving average strategy was that the weekly average price of the week which generated the signal could be attained during the next week. For instance, if the end of week 1 generated a buy signal at a weekly average price of $65 per cwt, then it was assumed that the range of prices in week 2 would include $65 per cwt with the actual trade taking place in week 2. Of course, some weeks a trader would have prices move in his favor with respect to the previous week's weekly average price and conversely the prices would move against the trader some weeks. However, in the long run these two forces were assumed to offset one another and the assumption would hold. Nevertheless, this study continued as if this major assumption held.

Tables II-IV provide the various averages tried, the penetration rule, if any, net profit, gross profit, gross losses, sum of largest set of consecutive losses, and the number of consecutive losses for the three markets. Gross profits and gross losses were calculated by substracting the initial buying price from the selling price. Net profit was determined by subtracting gross losses from gross profits in terms of dollars per hundredweight. The number of consecutive

TABLE II

MOVING AVERAGES RESULTS FOR OMAHA SLAUGHTER STEERS, 1972-1982

Moving Averages	Penetration Rule	Net Profit	Gross Profit	Gross Losses	Sum of Largest Set of Consecutive Losses	Number of Consecutive Losses
		----------Dollars Per Hundredweight----------				
1-2w*		107.53	147.24	40.71	6.01	15
2-8		73.59	88.16	14.57	4.26	3
2-7		71.62	88.68	17.06	4.36	4
3-7		62.13	83.09	20.96	5.90	4
1-3-5w	.09	56.42	74.69	18.27	8.97	3
3-10		55.42	69.13	13.71	6.64	3
3-4-6	.07	54.40	76.28	21.88	8.22	4
4-8		45.83	69.52	23.69	7.48	3
3-4-8		45.82	69.25	23.43	7.08	3
4-8	.04	44.49	73.82	29.33	7.28	3
3-4-8w		39.75	68.92	29.17	8.73	4
3-4-7w		35.94	68.46	32.52	9.08	4
4-8w	.05	35.90	67.47	31.57	8.46	5
3w-4w-14	.06	30.51	54.10	23.59	10.55	3

*"w" denotes linearly weighted moving average.

TABLE III

MOVING AVERAGES RESULTS FOR OMAHA SLAUGHTER HEIFERS, 1972-1982

Moving Averages	Penetration Rule	Net Profit	Gross Profit	Gross Losses	Sum of Largest Set of Consecutive Losses	Number of Consecutive Losses
		----------Dollars Per Hundredweight----------				
1-2w*		91.14	137.65	46.51	7.52	16
2-7		76.47	88.68	12.21	3.17	2
2-8		71.05	87.55	16.50	3.07	3
3-7		66.86	84.80	17.94	4.72	3
3-10		56.85	71.81	14.96	8.87	2
3-4-6		50.97	72.26	21.29	5.73	4
1-3-5w	.09	49.72	74.63	24.91	5.91	4
4-8		49.39	73.14	23.75	6.97	3
3-4-8		49.27	71.25	21.98	6.97	3
4-8	.04	49.14	69.73	20.59	6.97	3
4-8w	.05	44.31	71.03	26.72	11.13	2
3w-4w-14	.06	40.45	51.55	11.10	5.88	1
3-4-7w		38.60	61.42	22.82	10.53	4
3-4-8w		34.57	60.36	25.79	11.13	3

*"w" denotes linearly weighted moving average.

TABLE IV

MOVING AVERAGES RESULTS FOR TEXAS SLAUGHTER STEERS, 1972-1982

Moving Averages	Penetration Rule	Net Profit	Gross Profit	Gross Losses	Sum of Largest Set of Consecutive Losses	Number of Consecutive Losses
		----------Dollars Per Hundredweight----------				
1-2w*		143.49	173.69	30.20	4.35	12
2-7		68.75	97.42	28.67	6.53	6
2-8		56.26	88.36	32.10	8.35	5
3-4-6	.07	47.64	82.64	35.00	13.10	4
3-7		44.45	85.06	40.61	11.29	5
3-4-8		34.53	74.36	39.83	12.13	4
3-10		33.39	66.78	34.65	11.58	2
1-3-5w	.09	29.95	72.02	42.07	11.96	5
4-8		24.07	74.45	50.38	14.66	5
4-8	.04	23.11	74.20	51.09	14.66	5
3w-4w-14	.06	20.57	54.88	34.31	15.70	3
3-4-8w		15.74	74.61	58.87	19.66	6
3-4-7w		8.34	66.94	58.60	18.13	5
4-8w	.05	5.30	72.39	67.09	19.43	5

*"w" denotes linearly weighted moving average.

losses was generated by summing the occasions when two or more losses occurred in succession and the sum of largest set of consecutive losses was a simple addition of the greatest gross losses in succession. The moving averages were given in descending order in terms of net profit.

The 1-2w (1-2w denotes a set of averages where 1 signifies the first moving average (1 week), 2 signifies the second moving average (2 weeks), and w denotes linearly weighted) moving averages were the "best" averages in all three markets. Tables V-VII present the 1-2w averages with various penetration rules. Note that some penetration rules increased net profit while others decreased net profit compared to the no penetration rule. In all markets, the gross losses were reduced by the use of penetration rules. Specifically, 1-2w (10), were the optimum averages for Omaha steers, 1-2w (10) were best for Omaha heifers, and 1-2w (05) were the most profitable averages for Texas steers.[4] However, an alarming outcome for the 1-2w averages in all three markets was the number of occasions when the averages generated a buy signal one week and a sell signal the very next week. So to make the moving averages a more realistic marketing strategy a restriction was enforced to honor sell signals only between the seventeenth and twenty-fifth week after the intial buy signal. This strategy was set forth to ensure that the animals marketed weighed between 900-1100 pounds.

Another unexpected result from the 1-2w moving averages in the Omaha steer and heifer markets was the relative size of the gross

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[4]The number in parentheses indicates the penetration rule in cents per hundredweight.

TABLE V

THE 1-2w MOVING AVERAGES RESULTS WITH VARIOUS PENETRATION RULES FOR OMAHA SLAUGHTER STEERS, 1972-1982

Moving Averages	Penetration Rule	Net Profit	Gross Profit	Gross Losses	Sum of Largest Set of Consecutive Losses	Number of Consecutive Losses	Number of Pens
			Dollars Per Hundredweight				
1-2w		107.53	147.24	40.71	6.01	15	107
1-2w	.05	112.14	145.87	33.73	4.30	12	94
1-2w	.10	119.37	148.20	28.83	4.30	9	75
1-2w	.15	106.88	132.03	25.15	3.37	7	58

TABLE VI

THE 1-2w MOVING AVERAGES RESULTS WITH VARIOUS PENETRATION RULES FOR OMAHA SLAUGHTER HEIFERS, 1972-1982

Moving Averages	Penetration Rule	Net Profit	Gross Profit	Gross Losses	Sum of Largest Set of Consecutive Losses	Number of Consecutive Losses	Number of Pens
			Dollars Per Hundredweight				
1-2w		91.26	137.65	46.39	7.52	15	114
1-2w	.05	93.94	130.02	36.08	5.98	11	82
1-2w	.10	100.94	131.12	30.18	5.45	10	59
1-2w	.15	98.78	125.44	26.66	4.41	7	45

TABLE VII

THE 1-2w MOVING AVERAGES RESULTS WITH VARIOUS PENETRATION RULES FOR TEXAS SLAUGHTER STEERS, 1972-1982

Moving Averages	Penetration Rule	Net Profit	Gross Profit	Gross Losses	Sum of Largest Set of Consecutive Losses	Number of Consecutive Losses	Number of Pens
			Dollars Per Hundredweight				
1-2w		143.49	173.69	30.20	4.35	12	90
1-2w	.05	150.10	174.01	23.91	3.85	8	69
1-2w	.10	134.04	161.15	27.11	3.40	5	57
1-2w	.15	132.85	158.05	25.20	4.90	5	51

losses and the number of consecutive losses as compared with the other top moving averages. In the Texas market, the losses were very similar to the other averages implemented. Perhaps, if the gross losses could be substantially reduced without substantially reducing the net profit of the 1-2w moving averages, then a viable marketing strategy would exist.

Incorporating Relative Strength Index With Optimum Moving Averages

In the futures market, combinations of technical tools have provided more reliable trades compared with the use of a single tool. Using different technical tools simultaneously to yield more reliable trades is called "The Principal of Coincidence".[5] Using the previously stated principle, RSI along with moving averages could be expected to reduce the losses associated with the sole use of moving averages.

Most losses associated with a moving average scheme result from "whipsaw effects". A Relative Strength Index works best during times of consolidation which is where moving averages encounter the whipsaws. So the use of some objective rules with respect to RSI values, might enable cattlemen to enhance their trading abilities.

The RSI values for all three markets for the eleven year period ranged from the mid 20s to the low 90s which suggests that the 20s indicated the bottoming of the markets and the 90s indicated the top

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[5]Robert Parado and Gerry Jellis, "Putting Lines and Angles Together", Futures, January 1984, pp. 82-84.

of the markets. With the above information, three rules were implemented to augment the moving average scheme as follows:

1. Enter into a buy position whenever RSI fell below a value of 30, if the moving averages had not already indicated a buy signal earlier.

2. Never sell when the moving averages so indicated with RSI below a value of 40.

3. Sell whenever RSI rose above a value of 90, if the averages had not yet indicated a sell signal.

The results of these RSI rules in conjunction with the 1-2w moving averages and the 17 to 25 week restriction period can be seen in Tables VIII-X. Note that the figures quoted in Tables VIII-X are in terms of dollars per head, assuming that on the average the animals marketed would weigh 1000 pounds, as compared with dollars per hundredweight in the previous tables. The number of pens (determined by the number of buy signals generated by the marketing strategy) were reduced as were the number of consecutive losses in all cases. Although the more realistic technical marketing strategy produced a significantly lower net profit, the latter strategy did show some respectable results with every market having a positive average net profit per pen. So the technical marketing strategy with the 17 to 25 week restriction period might prove worthy in aiding producers in their marketing decisions.

At first glance, the marketing strategy put forth in this chapter might appear to be very useful to the cattle industry, however, this marketing strategy has not been compared with what cattlemen might be using currently. Therefore, the next chapter was devoted to testing

TABLE VIII

MOVING AVERAGE AND RELATIVE STRENGTH INDEX MARKETING STRATEGY RESULTS FOR OMAHA SLAUGHTER STEERS, 1972-1982

Moving Average	Penetration Rule	Net Profit	Gross Profit	Gross Losses	Sum of Largest Set of Consecutive Losses	Average[1] Net Profit/ Pen	Number of Consecutive Losses	Number of Pens
	$/cwt	----------Dollars Per Head----------						
1-2w* with RSI		396.20	886.90	490.70	66.10	16.51	1	24
1-2w with RSI	.05	206.70	870.80	664.10	143.20	7.95	2	26
1-2w with RSI	.10	539.00	1066.40	527.40	126.60	22.46	2	24
1-2w with RSI	.15	559.00	834.50	275.50	61.40	25.41	2	22

*"w" denotes linearly weighted moving average.

[1]Average net profit per pen is calculated by dividing the net profit by the number of pens.

TABLE IX

MOVING AVERAGE AND RELATIVE STRENGTH INDEX MARKETING STRATEGY RESULTS FOR OMAHA SLAUGHTER HEIFERS, 1972-1982

Moving Average	Penetration Rule	Net Profit	Gross Profit	Gross Losses	Sum of Largest Set of Consecutive Losses	Average[1] Net Profit/ Pen	Number of Consecutive Losses	Number of Pens
	$/cwt	----------Dollars Per Head----------						
1-2w* with RSI		392.70	793.90	401.20	132.80	15.10	2	26
1-2w with RSI	.05	379.00	901.80	522.80	195.90	15.79	2	24
1-2w with RSI	.10	515.90	965.40	449.50	143.20	23.45	2	22
1-2w with RSI	.15	497.80	866.80	369.00	91.70	24.89	1	20

*"w" denotes linearly weighted moving average.

[1]Average net profit per pen is calculated by dividing the net profit by the number of pens.

TABLE X

MOVING AVERAGE AND RELATIVE STRENGTH INDEX MARKETING STRATEGY
RESULTS FOR TEXAS SLAUGHTER STEERS, 1972-1982

Moving Average	Penetration Rule	Net Profit	Gross Profit	Gross Losses	Sum of Largest Set of Consecutive Losses	Average[1] Net Profit/ Pen	Number of Consecutive Losses	Number of Pens
	$/cwt	----------Dollars Per Head----------						
1-2w* with RSI		509.70	979.10	469.40	45.80	19.60	1	26
1-2w with RSI	.05	623.70	869.80	246.10	101.40	28.35	3	22
1-2w with RSI	.10	730.40	977.10	246.70	39.60	34.78	1	21
1-2w with RSI	.15	732.30	979.00	246.70	39.60	34.87	1	21

*"w" denotes linearly weighted moving average.

[1]Average net profit per pen is calculated by dividing the net profit by the number of pens.

this technical marketing strategy to a fixed period marketing strategy.

Summary

This chapter reviewed the popularity technical tools have had in the stock and futures market and suggested that those same technical tools might help cattlemen market their cash animals. After introducing the program that was to be used in this study, the discussion continued to be more specific about the time interval and the particular markets that would be used to calculate optimum moving average parameters. A warning was given for a nontested assumption that was assumed to hold over the long run.

Various moving averages were tested and illustrated in tables with 1-2w moving averages being superior in all markets. Penetration rules were added to assist in the profitability of the moving average scheme. A restriction period of 17 to 25 weeks after the initial buy signal before honoring any sell signals was instigated to provide a more realistic marketing strategy. Finally some objective rules of RSI were instigated in conjunction with the 1-2w moving averages in an attempt to improve the overall marketing scheme.

CHAPTER IV

TESTING THE TECHNICAL MARKETING STRATEGY AGAINST A FIXED PERIOD MARKETING STRATEGY

A marketing strategy of any sort will be useful only to the extent in which its rules are obeyed. The selection of a marketing strategy should be based upon one's circumstances such as the operator's risk-taking ability, goals, and understanding of the strategy. Any marketing strategy will inevitably have imperfections. However, if a producer knows of the limitations of the particular strategy, he can better prepare himself for the unpleasant times in order to reap the benefits of the profitable times. Therefore, the comparison of one strategy with another must continue if cattlemen hope to find the most suitable marketing strategy for their operation.

The 21-Week Marketing Strategy

The average feeding period for slaughter cattle since 1972 has been approximately 145 days.[1] Depending upon the weather, rations used, and the initial weights of the cattle, the feeding period would

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[1] As stated by Dr. Keith S. Lusby, Associate Professor of the Animal Science Department at Oklahoma State University.

vary. From the above data, a marketing strategy of buying, feeding, and selling slaughter cattle in 21 weeks (days converted to weeks because of the weekly price data that were used) was assumed to be one current cash marketing plan. However, some cattlemen might only feed 90 days in some instances, while in other instances they might feed as long as 200 days, so 145 days would not always be the exact feeding period. One reason for the feeding variance stemmed because cattle buyers were not necessarily ready for the delivery of the cattle at precisely 145 days (21 weeks) of feeding. Unfortunately, there is no documentation to support or reject the assumption that on the average, most slaughter cattle are marketed 21 weeks after they start a feeding program. Therefore, if the average feeding period is indeed 21 weeks, then one might logically conclude that cattle are also sold on the average of every 21 weeks.

Table XI presents the 21-week marketing strategy for the three markets during the period of 1972-1982. Note that all the 1-2w moving averages tried in the three markets (Tables VIII-X) were superior in terms of net profit, gross losses, the sum of the largest set of consecutive losses, and the average net profit per pen compared with the 21-week strategy. The technical marketing strategy had fewer or the same consecutive losses, with the exception of the 1-2w (05) strategy in the Texas market, when compared with the 21-week plan. Also, the technical strategy had fewer pens in every case. Since historical data showed that many of the technical marketing strategies were superior to the 21-week plan, the optimum marketing strategy,

TABLE XI

TWENTY-ONE WEEK MARKETING STRATEGY RESULTS FOR SLAUGHTER CATTLE, 1972-1982

Market	Net Profit	Gross Profit	Gross Losses	Sum of Largest Set of Consecutive Losses	Average[1] Net Profit/ Pen	Number of Consecutive Losses	Number of Pens
	----------Dollars Per Head----------						
Omaha Choice 2-4 900-1100 lbs Steers	200.10	889.30	689.20	204.80	7.41	3	27
Omaha Choice 2-4 900-1100 lbs. Heifers	230.90	880.40	649.50	188.20	8.55	2	27
Texas Choice 2-4 900-1100 lbs Steers	247.90	904.80	656.90	174.90	9.18	2	27

[1]Average net profit per pen is calculated by dividing the net profit by the number of pens.

namely the 1-2w moving averages with RSI, was measured against the 21-week strategy outside the moving averages parameter estimation period (1972-1982).

The Technical Strategy Versus the 21-Week Strategy

For purposes of simplicity, both fixed and variable expenses were excluded from the analysis because they were assumed to be the same regardless of the marketing strategy chosen. The strategies assumed the operation to have the capability of being a continuous feedlot program.

The test period started on December 25, 1982 and concluded on April 7, 1984. Tables XII-XIV present the results of the two strategies in the various markets. Appendixes A, B, and C demonstrate how the results were obtained using a technical marketing strategy in the various markets. The technical tools were superior to the 21-week option in terms of net profit and average profit per pen in the steer markets and mixed in the heifer market.

The disappointing results in the heifer market might have occurred as the result of the recent lack of interest in feeding heifers, although the technical tools did perform well during the parameter estimation period for heifers. So there really appears to be no answer to the sudden turn about of the two strategies for slaughter heifers. However, the tecnical marketing strategy did provide superior results with the 1-2w (10) and 1-2w (15) marketing strategies compared with the 21-week strategy.

TABLE XII

MARKETING STRATEGIES RESULTS FOR OMAHA SLAUGHTER STEERS, DECEMBER 25, 1982-APRIL 7, 1984

Strategy	Net Profit	Gross Profit	Gross Losses	Largest Loss	Average[1] Net Profit/Pen	Number of Pens
	----------Dollars Per Head----------					
21-week	86.50	164.00	77.50	77.50	28.83	3
1-2w* with RSI	93.50	182.50	89.00	89.00	31.17	3
1-2w(05) with RSI	93.50	182.50	89.00	89.00	31.17	3
1-2w(10) with RSI	149.50	149.50	0	0	74.75	2
1-2w(15) with RSI	142.00	142.00	0	0	71.00	2

*"w" denotes linearly weighted moving average

[1]Average net profit per pen is calculated by dividing the net profit by the number of pens.

TABLE XIII

MARKETING STRATEGIES RESULTS FOR OMAHA SLAUGHTER HEIFERS, DECEMBER 25, 1982-APRIL 7, 1984

Strategy	Net Profit	Gross Profit	Gross Losses	Largest Loss	Average[1] Net Profit/Pen	Number of Pens
	----------Dollars Per Head----------					
21-week	86.70	164.70	78.00	78.00	28.90	3
1-2w* with RSI	83.70	168.20	84.50	84.50	27.90	3
1-2w(05) with RSI	83.70	168.20	84.50	84.50	27.90	3
1-2w(10) with RSI	104.70	189.20	84.50	84.50	34.90	3
1-2w(15) with RSI	104.70	189.20	84.50	84.50	34.90	3

*"w" denotes linearly weighted moving average

[1]Average net profit per pen is calculated by dividing the net profit by the number of pens.

TABLE XIV

MARKETING STRATEGIES RESULTS FOR TEXAS SLAUGHTER STEERS, DECEMBER 25, 1982-APRIL 7, 1984

Strategy	Net Profit	Gross Profit	Gross Losses	Largest Loss	Average[1] Net Profit/Pen	Number of Pens
	----------Dollars Per Head----------					
21-week	85.40	165.90	80.50	80.50	28.47	3
1-2w* with RSI	130.60	213.60	83.00	83.00	43.53	3
1-2w(05) with RSI	130.60	213.60	83.00	83.00	43.53	3
1-2w(10) with RSI	111.80	213.60	101.80	101.80	37.27	3
1-2w(15) with RSI	147.00	147.00	0	0	73.50	2

*"w" denotes linearly weighted moving average

[1]The average net profit per pen is calculated by dividing the net profit by the number of pens.

The success that was found in the three markets suggest that the technical marketing strategy put forth in this study was a viable alternative to an assumed current marketing scheme. The technical tools did not produce a loss during the test period in two strategies in the Omaha steer market and in one strategy in the Texas steer market. However, the Omaha heifer market results were somewhat disappointing.

Although the technical strategy was not perfect, historical data suggests that cattlemen can enhance their marketing abilities by using technical tools. Technical marketing strategies are not intended to replace what cattlemen feel prices are going to do, but simply augment their understanding of the present market conditions.

Summary

A 21-week marketing plan was introduced based upon the average feeding period of cattle of 21 weeks. The limitations and narrowness of this marketing strategy were brought forth in an attempt not to mislead the reader into thinking that all slaughter cattle were marketed every 21 weeks.

The 21-week strategy was tested against the optimum technical strategy from December 25, 1982 through April 7, 1984. The technical strategy proved to be vastly superior in the steer markets, but mixed in the heifer market. The results of the test left little doubt that technical tools could aid producers in their marketing decisions.

CHAPTER V

CONCLUSIONS AND THOUGHTS ABOUT FUTURE RESEARCH

Since the early 1970s, cattlemen have been plagued with extremely volatile cattle prices. The past decade saw the exit of many cattlemen from livestock production because of their inability to cope with the highly capital-intensive operations of the cattle industry. A majority of those exiting during the past decade lacked the necessary skills for the successful marketing of their livestock. So to aid producers in their marketing decisions, marketing strategies which can decrease profit variability while maximizing net profits need to be developed.

Chapter II presented the theoretical background for using moving averages and Relative Strength Index as price trend indicators. Calculations and illustrations of two and three moving averages trade signals were presented. A RSI illustration was used to depict overbought and oversold conditions in the futures market for live cattle. The necessary calculations for RSI were also given.

Chapter III contained a description of the moving average and RSI program used for this study. The method for optimizing the moving average parameters was explained with the results shown. A period restriction for honoring sell signals was instigated in order to produce a more useful marketing strategy. RSI was incorporated with

the moving average technique in order to increase the effectiveness of the overall marketing strategy. The 1-2w moving average scheme with RSI was found to be superior to the other technical strategies relying solely upon moving averages. The incorporation of RSI allowed earlier detection of market bottoms and tops compared with the sole use of moving averages.

Chapter IV introduced the conception of a 21-week marketing plan based upon the average feeding period of slaughter cattle. The 21-week plan was tested against the technical marketing strategy developed in Chapter III during the period of December 25, 1984 to April 7, 1984. In the Omaha steer market, the technical strategies yielded a more profitable outcome compared with the 21-week plan. The range in net profits for the technical tools was from $93.50 per head to $149.50 per head depending upon the penetration rule chosen as compared with a net profit of $86.50 per head for the 21-week strategy. The results were similar in the Texas steer market with a range of net profits from $111.80 per head to $147 per head for the technical tools and a net profit of $85.40 per head for the 21-week plan. However, the Omaha heifer market was completely different with the 21-week strategy yielding a net profit of $86.70 per head compared with the technical strategies' range of $83.70 per head to $104.70 per head.

The primary objective of this thesis was met by the establishment of the 1-2w moving averages incorporating RSI as the optimum technical marketing strategy. The first specific objective was met by determining the 1-2w averages as the optimum moving averages for the past decade. The second specific objective of increasing profits and

reducing profit variability with the use of tehcnical tools was only fifty percent obtained. The technical tools reduced profit variability in all the markets during both the parameter estimation period (1972-1982) and the testing period, however, the technical tools did not increase the profits in all cases in the heifer market during the testing period. Therefore, this technical marketing strategy should be considered for market analysis in steer markets, but should be refined before considering its use in the heifer markets.

The technical marketing strategy put forth in this study would have indirectly helped producers manage their risk by reducing profit variability. Thus, the overall conclusion was that the technical strategy, namely moving averages incorporated with RSI, could greatly aid cattlemen in their marketing decisions as when to buy and sell the physical animal.

Future Research

Viable marketing strategies are essential for American Agriculturalists to survive. Other technical tools need to be optimized not only over long periods of time which was done in this study, but during times of uptrending markets and downtrending markets. The principle of coincidence could be explored using more than just two technical tools. Also, technical tools could be experimented with to find optimum marketing strategies for stocker/feeder operations and for cow-calf operations to be implemented by producers in their marketing decisions. And finally, a

more comprehensive research is warranted on Wilder's RSI in which this study has merely scratched the surface.

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APPENDIXES

APPENDIX A

TECHNICAL MARKETING STRATEGY RESULT WITH A $.10/CWT PENETRATION RULE FOR OMAHA CHOICE 2-4, 900-1100 POUND STEERS FROM 12-25-82 TO 4-7-84

Date	Price[1]	SW[2]	RSI	Reason[3]	Gain (Loss)[4]
12-25-82	58.75B	58.61	39.06	MA	
01-01-83	59.50	59.25	42.50		
01-08-83	58.50(S)	58.83	39.31	Not Honored	
01-15-83	59.90	59.43	45.48		
01-22-83	59.95	59.66	44.27		
01-29-83	59.38	59.43	43.66		
02-05-83	60.12	59.87	47.07		
02-12-83	60.95	60.67	50.67		
02-19-83	61.28	61.17	52.07		
02-26-83	62.45	62.06	56.75		
03-05-83	62.58	62.53	57.25		
03-12-83	63.00	62.86	58.90		
03-19-83	63.80	63.53	61.91		
03-26-83	64.50	64.26	64.38		
04-02-83	66.25	65.66	69.66		
04-09-83	66.95	66.71	71.48		
04-16-83	68.02	67.66	74.05		
04-23-83	67.85	67.90	72.93		
04-30-83	68.00	67.95	73.31		
05-07-83	67.45S	67.63	69.42	MA-20th week	$87.00
05-14-83	67.65	67.58	70.04		
05-21-83	67.55	67.58	69.28		
05-23-83	67.40	67.45	68.09		
06-04-83	67.47	67.44	68.36		
06-11-83	66.72	66.97	62.20		
06-18-83	66.50	66.57	60.48		
06-25-83	65.00	65.50	50.26		
07-02-83	63.82	64.21	43.97		
07-09-83	63.75	63.77	43.62		
07-16-83	62.25	62.75	36.87		
07-23-83	61.50	61.75	33.66		
08-06-83	61.25	61.30	33.08		
08-13-83	61.95B	61.71	38.44	MA	
08-20-83	62.02	61.99	38.97		
08-27-83	61.55	61.70	36.70		
09-03-83	59.60	60.25	29.11		
09-10-83	59.00	59.20	27.25		
09-17-83	59.30	59.20	29.68		
09-24-83	58.45	58.73	26.93		
10-01-83	60.00	59.48	38.15		
10-08-83	59.80	59.86	37.35		
10-15-83	60.00	59.93	38.73		
10-22-83	59.75	59.83	37.62		
10-29-83	58.75	59.08	33.47		
11-05-83	58.05	58.28	30.90		

Date	Price[1]	SW[2]	RSI	Reason[3]	Gain (Loss)[4]
11-12-83	58.70	58.48	35.83		
11-19-83	58.75	58.73	36.20		
11-26-83	59.50	59.25	41.73		
12-03-83	62.05	61.20	55.75		
12-10-83	60.75	61.18	49.24		
12-17-83	62.30	61.78	55.86		
12-24-83	63.40	63.03	59.86		
12-31-83	64.94	64.42	64.68		
01-07-84	65.00	64.98	64.86		
01-14-84	66.70	66.13	69.52		
01-21-84	68.40	67.83	73.34		
01-28-84	68.20S	68.26	72.19	25th week	$62.50
02-04-84	67.45	67.70	67.91		
02-11-84	67.25	67.31	66.78		
02-18-84	66.55	66.78	62.81		
02-25-84	66.90B	66.78	63.96		
03-03-84	67.50	67.30	65.91		
03-10-84	68.05	67.86	67.64		
03-17-84	69.20	68.81	70.95		
03-24-84	68.25	68.56	65.03		
03-31-84	68.90	68.68	67.06		
04-07-84	68.15	68.40	62.55		

[1]Weekly average price ($/cwt) and one week moving average with B and S denoting buy and sell signals respectively.

[2]Two-week linearly weighted moving average.

[3]Details why the buy was initialed (i.e. MA denotes moving average signal) and why the sell signal was honored (i.e. between 17-25 week period and confirmed by RSI).

Period	Number of Signals Not Honored
12-25-82 to 05-07-83	4
08-13-83 to 01-28-84	6
02-25-84 to 04-07-84	3

[4]Figures given in $/head.

APPENDIX B

TECHNICAL MARKETING STRATEGY RESULT WITH A $.15/CWT

PENETRATION RULE FOR OMAHA CHOICE 2-4,

900-1100 POUND HEIFERS FROM

12-25-82 TO 4-7-84

Date	Price[1]	SW[2]	RSI	Reason[3]	Gain (Loss)[4]
12-25-82	57.38B	57.17	39.87	MA	
01-01-83	58.12	57.87	43.17		
01-08-83	57.65(S)	57.80	41.61	Not Honored	
01-15-83	58.85	58.45	46.89		
01-22-83	58.48	58.60	45.52		
01-29-83	58.60	58.56	46.07		
02-05-83	59.72	59.34	51.04		
02-12-83	60.25	60.07	53.23		
02-19-83	60.55	60.45	54.47		
02-26-83	61.45	61.15	58.08		
03-05-83	61.35	61.38	57.53		
03-12-83	60.15	60.55	51.31		
03-19-83	62.78	61.90	61.21		
03-26-83	63.60	63.32	63.69		
04-02-83	65.38	64.78	68.40		
04-09-83	66.05	65.82	69.98		
04-16-83	67.25	66.85	72.63		
04-23-83	66.40S	66.68	68.06	MA-18th week	$90.20
04-30-83	67.05B	66.83	69.63		
05-07-83	66.20	66.48	65.11		
05-14-83	66.40	66.33	65.68		
05-21-83	66.40	66.40	65.68		
05-28-83	65.85	66.03	62.45		
06-04-83	63.25	64.11	49.97		
06-11-83	64.38	64.00	54.25		
06-18-83	64.10	64.19	53.04		
06-25-83	62.32	62.91	46.01		
07-02-83	62.25	62.27	45.75		
07-09-83	62.94	62.71	48.79		
07-16-83	61.18	61.76	42.29		
07-23-83	60.02	60.40	38.64		
07-30-83	59.80	59.87	37.97		
08-06-83	59.70	59.73	37.65		
08-13-83	60.25	60.06	40.61		
08-20-83	60.72	60.56	43.09		
08-27-83	59.85	60.14	39.77		
09-03-83	58.05	58.65	33.95		
09-10-83	57.75	57.85	33.08		
09-17-83	58.30	58.11	36.30		
09-24-83	57.50	57.76	33.75		
10-01-83	59.05	58.53	42.21		
10-08-83	58.60S	58.75	40.59	MA-24th week	($84.50)
10-15-83	58.75	58.70	41.40		
10-22-83	58.80	58.78	41.68		
10-29-83	57.85	58.16	37.91		
11-05-83	57.00	57.28	34.88		

Date	Price[1]	SW[2]	RSI	Reason[3]	Gain (Loss)[4]
11-12-83	57.55B	57.36	38.32	MA	
11-19-83	57.70	57.65	39.26		
11-26-83	58.75	58.40	45.54		
12-03-83	61.25	60.41	56.94		
12-10-83	60.18	60.53	51.93		
12-17-83	61.80	61.26	57.96		
12-24-83	63.70	63.06	63.72		
12-31-83	65.38	64.82	67.90		
01-07-84	64.62	64.87	64.29		
01-14-84	66.00	65.54	67.65		
01-21-84	67.65	67.10	71.15		
01-28-84	67.55	67.58	70.65		
02-04-84	66.55	66.88	65.69		
02-11-84	66.32	66.39	64.57		
02-18-84	65.35	65.67	59.92		
02-25-84	65.70	65.58	61.01		
03-03-84	66.20	66.03	62.58		
03-10-84	66.65	66.50	63.98		
03-17-84	68.10	67.61	68.13		
03-24-84	67.45S	67.66	64.54	MA-19th week	$99.00
03-31-84	67.90B	67.75	65.88		
04-07-84	67.05	67.33	61.18		

[1]Weekly average price ($/cwt) and one week moving average with B and S denoting buy and sell signals respectively.

[2]Two-week linearly weighted moving average.

[3]Details why the buy was initialed (i.e. MA denotes moving average signal) and why the sell signal was honored (i.e. between 17-25 week period and confirmed by RSI).

Period	Number of Signals Not Honored
12-25-82 to 04-23-83	4
04-30-83 to 10-08-83	6
11-12-83 to 03-24-83	6
03-31-83 to -4-07-84	1

[4]Figures given in $/head.

APPENDIX C

TECHNICAL MARKETING STRATEGY RESULT WITH A $.15/CWT

PENETRATION RULE FOR TEXAS CHOICE 2-4,

900-1100 POUND STEERS FROM

12-25-82 TO 4-7-84

Date	Price[1]	SW[2]	RSI	Reason[3]	Gain (Loss)[4]
12-25-82	61.44	61.32	42.67		
01-01-83	62.12B	61.89	45.23	MA	
01-08-83	61.55(S)	61.74	43.48	Not Honored	
01-15-83	62.25	62.01	46.23		
01-22-83	61.95	62.05	45.21		
01-29-83	61.45	61.61	43.50		
02-05-83	62.05	61.85	46.14		
02-12-83	62.78	62.53	49.25		
02-19-83	62.70	62.72	48.92		
02-26-83	63.55	63.26	52.59		
03-05-83	64.15	63.95	55.04		
03-12-83	64.10	64.11	54.79		
03-19-83	64.90	64.63	58.13		
03-26-83	66.15	65.73	62.75		
04-02-83	69.10	68.11	70.92		
04-09-83	70.58	70.08	74.00		
04-16-83	72.52	71.87	77.38		
04-23-83	71.55S	71.87	72.32	MA-17th week	$94.30
04-30-83	70.80	71.05	68.58		
05-07-83	68.98	69.58	60.42		
05-14-83	69.30	69.19	61.29		
05-21-83	69.35	69.33	61.43		
05-28-83	69.05	69.15	60.00		
06-04-83	68.34	68.57	56.63		
06-11-83	68.15	68.21	55.73		
06-18=83	67.52	67.73	52.74		
06-25-83	65.98	66.49	46.20		
07-02-83	65.18	65.44	43.20		
07-09-83	65.28	65.24	43.69		
07-16-83	63.70	64.22	38.08		
07-23-83	63.10	63.30	36.18		
07-30-83	62.95	63.00	35.71		
08-06-83	63.42B	63.26	38.46	MA	
08-13-83	63.88	63.72	41.11		
08-20-83	63.65	63.72	40.18		
08-27-83	61.75	62.38	33.42		
09-03-83	59.15	60.01	26.79		
09-19-83	59.06	59.09	26.59		
09-17-83	59.45	59.32	29.02		
09-24-83	59.30	59.35	28.63		
10-01-83	60.90	60.36	38.24		
10-08-83	61.22	61.11	39.98		
10-15-83	61.00	61.07	39.16		
10-22-83	60.82	60.88	38.47		
10-29-83	59.80	60.14	34.72		
11-05-83	59.30	59.46	33.02		

Date	Price[1]	SW[2]	RSI	Reason[3]	Gain (Loss)[4]
11-12-83	59.94	59.72	37.25		
11-19-83	61.02	60.66	43.71		
11-26-83	62.21	61.81	49.84		
12-03-83	64.10	63.47	57.72		
12-10-83	64.75	64.53	60.04		
12-17-83	66.50	65.91	65.53		
12-24-83	67.90	67.43	69.18		
12-31-83	69.50	68.96	72.73		
01-07-84	68.69S	68.96	68.43	MA-23rd week	$52.70
01-14-84	69.05	68.93	69.30		
01-21-84	70.40B	69.95	72.37		
01-28-84	69.82	70.01	69.17		
02-04-84	68.72	69.08	63.44		
02-11-84	68.25	68.40	61.11		
02-18-84	67.72	67.89	58.50		
02-25-84	68.20	68.04	60.16		
03-03-84	69.25	68.90	63.59		
03-10-84	70.18	69.87	66.35		
03-17-84	71.38	70.98	69.56		
03-24-84	70.85	71.02	66.54		
03-31-84	71.58	71.33	68.56		
04-07-84	71.35	71.42	67.18		

[1]Weekly average price ($/cwt) and one week moving average with B and S denoting buy and sell signals respectively.

[2]Two-week linearly weighted moving average.

[3]Details why the buy was initialed (i.e. MA denotes moving average signal) and why the sell signal was honored (i.e. between 17-25 week period and confirmed by RSI).

Period	Number of Signals Not Honored
01-01-83 to 04-23-83	4
08-06-83 to 01-07-84	4
01-21-84 to 04-07-84	4

[4]Figures given in $/head.

VITA

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