Price Risk Management in July Kansas City Wheat Futures

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Background

Wheat prices have trended lower in the U.S. since the early to mid-1990s. Table 1 shows crop year average cash prices, production in the U.S. and the world, exports from the U.S., and ending stocks in the U.S. from 1994/95 through 2001/2002. Production in the U.S. has declined in the presence of downward trending prices, but world production has trended higher. U.S. exports worked higher until 1998/1999 and then dropped below the billion bushel level in the 2001/2002 crop year (June 1, 2001 to May 31, 2002). With 40 to 60 percent of U.S. production moving into exports, the U.S. wheat producer is tied directly to what is happening at the world level for wheat, which is an important global commodity. The risks of volatile and low prices are as high as they have ever been.

Table 1. U.S. and World Wheat Production with U.S. Prices, Exports, and Ending Stocks					
	Production		U.S. Average		U.S. Ending
Crop Year	U.S.	World	Cash Price	U.S. Exports	Stocks
	(million bu.)	(million MT)	$/bu	million bu.	million bu.
1994/95	2,321	525	3.45	1,188	507
1995/96	2,183	537	4.55	1,241	376
1996/97	2,285	583	4.30	1,001	444
1997/98	2,481	609	3.38	1,040	722
1998/99	2,547	588	2.65	1,042	946
1999/00	2,299	586	2.98	1,090	950
2000/01	2,232	584	2.62	1,061	876
2001/02	1,958	580	2.78	960	758
Source: USDA. *World Agricultural Supply and Demand Estimates*, *http://usda.mannlib.cornell.edu/*					

In any price risk management plan, the place to start is to establish a probable price range for the upcoming year based on fundamental supply-demand considerations. A model of the relationships between prices and ending stocks captures the essence of the fundamental relationships. This procedure is developed in detail by Kenyon and Lucas in the Rural Economic Analysis Program (REAP) research report *Wheat Pricing Guide* (R039) and is at *www.reap.vt.edu,* publications, research reports.

Based on the data in Table 1, clearly a negative bias exists to U.S. wheat prices relative to U.S. ending stocks in recent years. The reason is the expanding world-level production. The growing competition for export markets is important to the U.S. producer. The *Wheat Pricing Guide* takes account of the changing relationships and will be useful to a producer in establishing perspective. To be good at price risk management, the producer must be willing to forward price. Wheat is a global commodity; the producer, at any one point in time, is a price taker and subject to the supply-demand-generated world price. A price taker cannot control price, but the producer can choose *when to price* and, in the process, have an influence on the profitability of his or her business.

Wheat can be forward priced in at least three basic ways:

1. *Cash forward contracts*. A buyer extends an offer to a grower at a specific cash price for delivery at a future harvest or post-harvest date. The cash offer is tied to futures prices by the cash-futures basis. Delivery must be made by the producer, so there is little flexibility to change or adjust. When a cash forward delivery contract is signed, the buyer will immediately sell wheat futures (usually July) to cover the risk that prices will go down. The cash contract offer will, therefore, tend to go up or down with increases and decreases in the underlying futures contract.

2. *Hedging by selling futures*. The producer goes directly to the futures market, sells futures, and thereby establishes a specific price subject to basis performance.

$$FP = FUTURES + BASIS$$

Where FP   = the forward pricing opportunity in the futures,
       FUTURES = the trading level of the appropriate wheat futures contract (usually July), and
       BASIS   = the cash-futures relationship that localizes the Chicago Board of Trade or Kansas City Board of Trade discovered price for wheat.

Once the basis estimate is determined from local cash and national-level futures prices from past years, it is essentially set for the new production year unless unusual supply or demand circumstances suggest an adjustment is needed. The FP, therefore, tends to go up and down directly with the discovered prices in the futures market. The producer is exposed to basis risk because the final net price depends on the actual, not expected, level of the cash-futures basis when the cash product is sold and the short (selling futures is "going short") futures positions are closed out by buying back the contracts. If the wheat market declines, the futures are bought back at lower prices, and the funds to cover cash price declines are accumulating in the futures account. But if the market goes up, the producer can receive "margin calls" and be asked to send funds to the broker. The margin calls will continue so long as the market moves higher. The final net price is then the cash price reduced by losses in the futures account. Whether price trend is up or down, net price is always the cash price plus the results of the "round turn" in futures from selling early and buying back at a later date. (Details on basis calculations and use and on margin accounting are available in *Agricultural Futures and Options: Principles and Strategies* by Purcell and Koontz, Prentice Hall, 1999, ISBN# 0-13-779943-8.)

3. *Setting a price floor by buying a put option*. The price floor or PFL is set by

$$PFL = STRIKE\ PRICE + BASIS - PUT\ PREMIUM$$

Where   PFL   = the floor price being offered the producer, and
       STRIKE PRICE = a specific futures price in terms of 10-cent increments.
       PUT PREMIUM   = cost of the right to be short in futures at a specific strike price, and
       FUTURES and BASIS are as defined above.

Options on wheat trade for "strike prices" in 10-cent increments ($2.60, $2.70, $2.80, etc.). Producers can choose higher or lower price floors by buying put options for higher or lower strike prices. If the market goes down, the put option can be sold at a price, its premium, above its initial cost. The decline in cash prices is covered by the increasing premium value of the put option. Basis risk is still present because the put option will move, as it approaches maturity, to an option premium approaching the full observed decline in the cash market and thereby provide the exact floor price expected only when closing basis is the same as the allowed for basis early in the year. Option premiums will be higher in volatile markets and with more time left before expiration. Options can be a relatively costly way of acquiring price insurance. But if the market goes up, the producer will benefit as soon as the increase matches the option premium. There can never be margin calls when producers buy put options.

Timing of Action Is the Key

Regardless of which of the three price risk management tools is selected, the key to a successful price risk management program is knowing when to take action—and having the discipline to take that action.

The issue of timing is difficult. Often, the correct thing to do is to take action while prices are still trending higher. But many producers have trouble with this decision. What if the market goes up after the cash contract is signed or the futures contracts are sold? What is an opportunity cost (the chance to sell at higher levels) is often seen as a loss and a mistake by producers, and they are reluctant to take action the next time the same scenario presents itself.

A number of approaches to technical analysis of bar charts for the wheat market can help with this timing decision and the related willingness to take action. Learning to "read" the bar chart can help, and basic tools can be applied to the chart. This section introduces some widely used chart-based technical tools. The intent is to demonstrate "chart reading" with selected chart patterns and, at the same time, start to build a reason for producers who either have trouble reading the chart or lack the discipline to take action on chart-based signals to look for a more objective approach. But before we look at the charts, exploring what is meant by "selective hedging" as it will be presented in these materials is useful.

Selective Hedging

Most users of the futures in commodity markets and most advisory services and risk management services gravitate toward a *selective hedger* status.   A simplistic approach that sells futures and holds the short hedges until the cash product is sold or an approach that accepts a cash forward contract offer from a buyer may be a good place to start. But the unpredictable nature of weather in commodities like hard red winter wheat usually means producers are second guessing the simplistic strategy within the first few years of their price risk management program. A price that barely covers costs of production may look attractive early in the growing season when the fundamental supply-demand outlook is bearish, but weather can then prompt price rallies that push price far above the early-year price. If forward pricing is done with a cash contract, producers suffer an opportunity cost in the form of a missed chance to get a much higher price, and they feel as if they have made a mistake.   If the forward pricing is done with futures contracts, margin calls that continue as the market moves up add to the cost of the forward pricing program. Sustained margin calls can strain producers' access to capital. When margin calls are being received, it is in fact true that the short hedge in the futures *will ensure the specific price at which hedges are placed subject to basis performance*. The only costs that are not just opportunity costs are the interest charges on the added margin monies. But sustained margin calls bring difficult problems for producers. The worst possible scenario is one in which producers can no longer answer margin calls as the market moves up and the short hedges are removed. If the weather then improves and the market declines dramatically, a worst case scenario develops for producers who, having removed the hedges due to margin money concerns, have no protection as prices plummet.

Put option strategies are some producers' answer to the margin call dilemma and to concerns about missing the benefits of unexpected higher prices. But option premiums can be quite high in volatile markets with several months before harvest. Buying out-of-money puts to keep premium costs down lowers the price floor that producers are attempting to establish. Having worked through one or more of the futures or options strategies and started to look at price risk management in a broader context, some producers move toward a selective hedging approach. *The idea is to have short hedges in place when the price trend is down and to buy back those short hedges when the price trend turns up*. The producer will avoid the opportunity costs and margin problems associated with short hedges in upward trending markets, and he or she will be in a position to benefit from the rising cash prices by *selecting* a position that deliberately has the farm firm exposed to the risks in the cash market.

Timing the Placing and Lifting of Selective Hedges

The timing of sell and buy-back decisions in selective hedging strategies is the key to success, and timing is not easy. If the timing of the actions *is* effective, producers can have the best of all worlds: protection from short hedges when the price trend is down, and exposure to and benefit from rising cash prices when the price trend is up. As suggested earlier, one approach to this "timing" is to read the bar charts for widely recognized buy and sell signals. In this section, I will demonstrate several chart patterns that are widely used.

Before starting to watch for chart-based signals, however, a producer needs to establish a reasonable price range for the year based on fundamental supply-demand considerations. The reader is again encouraged to examine and use the simple model of the relationship between cash prices and ending stocks for wheat in the pricing guide by Kenyon and Lucas on the REAP website, *www.reap.vt.edu*. It does no good for the wheat producer to muster courage and discipline to do some forward pricing and then set price objectives that the fundamentals suggest are highly unlikely to be offered during the year.

Trend Line Chart Signals

One widely used approach to the timing of decisions by a selective hedger is to read the chart for appropriate sell signals to place short hedges and then continue to use the chart to look for chart-based buy signals to remove the short hedges. The July 1998 Kansas City wheat futures chart provides an illustration (Figure 1). An uptrend line is drawn across two price lows, and a trend line hooking the harvest-period low on this contract in early July 1997 and the dip to the 385[1] area in early October provides an illustration of an uptrend line that chart watchers would like to see. The two lows are at least 10 trading days apart, and the trend line is not very steep in slope. When the market closes below that trend line in late October, a sell signal indicates that hedges should be placed. Sell-stop orders 1-2 cents below the trend line will place the short hedges, or market orders can be placed near the close when it is clear the close will be below the trend line. Short hedges would have been placed in the 390-395 price range: these would be attractive prices, probably in the upper one-third of any fundament supply-demand price range that might have been established for the year.

Once those short hedges are placed, the chart later allows the sketching of a downtrend line hooking the mid-October high and the early-December high. A buy signal would have been generated by a close above that trend line during January in the 365 price area. As the market tries to rally and show something of a more sustained price appreciation during February and March, the selective hedger would now be off the short hedges and looking to benefit from an upward trending cash market.

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[1] Wheat futures are traded in cents per bushel. When dealing directly with a chart, I will use cents per bushel such as the 385 here. When discussing wheat prices in general, I will often shift to dollars per bushel, such as $3.85, because dollars per bushel is the way producers think about prices.

Figure 1. Trend Line Sell and Buy Signals on July 1998 KC Wheat
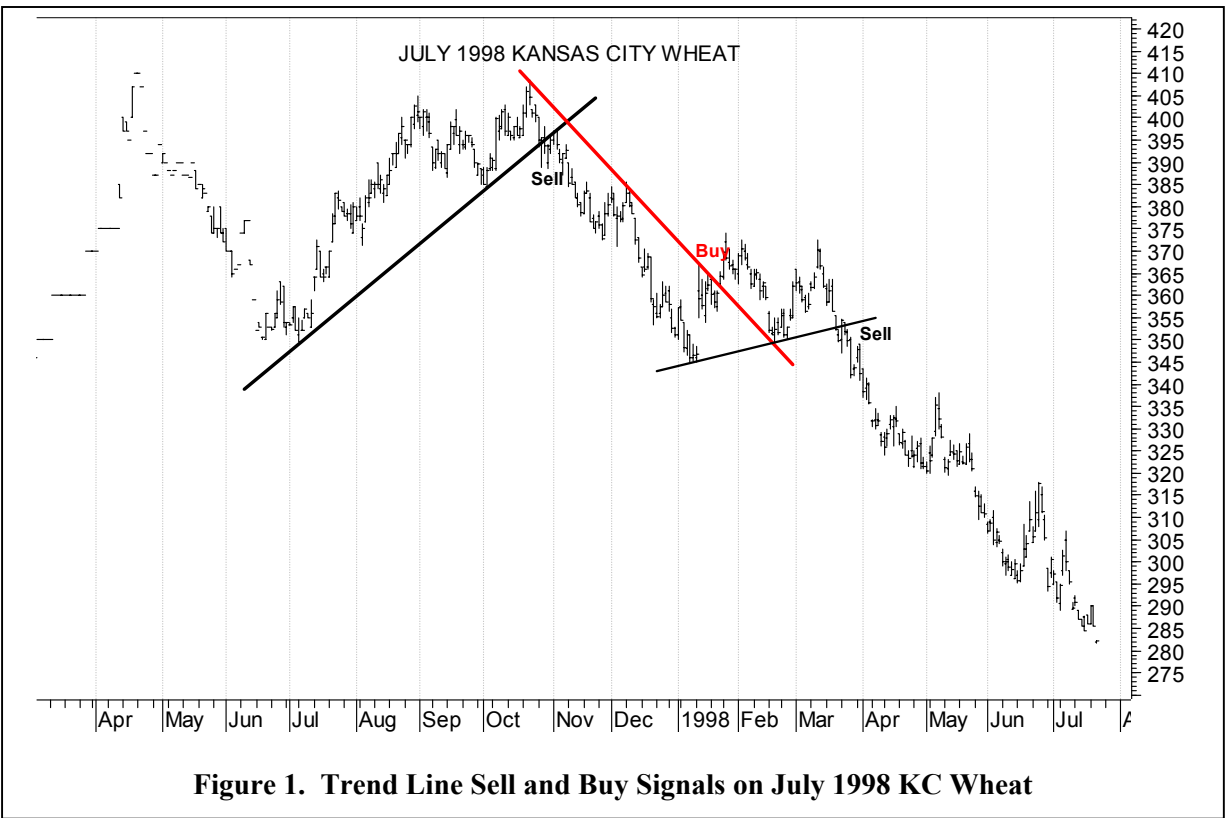
Subsequent sell signals are generated on the chart, however. Continuing to use the trend line idea by hooking the early-January and mid-to-late February lows allows a trend line that would generate a sell signal with a close below that line in the 350-355 area. Those short hedges should have been in place until late June or early July. A downtrend line hooking the mid-March and the early-May highs would have been taken out by a close above it in late June, which is appropriate timing for removing short hedges as the producer moves through harvest.

A moment's reflection indicates that while a chart line idea has some objectivity associated with it in terms of taking action on closes that violate the trend lines, it still has a judgmental component. In the 1998 contract, for example, some might argue that connecting the early-July low with the mid-September low would have generated a sell signal earlier. The earlier sell still would have put the producer in good shape, but using these "steeper" trend lines can be problematic.

Useful chart-related information is also associated with the new life-of-contract lows that occurred in early January in the 345-350 area. Those lows and the rally after they were established generate what chart watchers call a *support plane*. Using the trend line approach, the short hedges would be bought back in mid-to-late January. A bit later, even without using the little trend line connecting the early-January and mid-February lows, an important sell signal is generated in late March when the market shows two consecutive closes in new life-of-contract low price ground. The two consecutive closes below the old life-of-contract low is a sell signal on a commodity such as hard red winter wheat that is recognized in every corner of the world. After that sell signal, the market moved substantially lower toward harvest.

As this commentary suggests, additional aids can be brought to the situation by the chart reader. The life-of-contract low is an extremely important support plane that should always be watched. Anytime two consecutive closes are below the old life-of-contract price low, the odds are extremely high that the

market will go substantially lower. The sell signal should be used to replace short hedges if this happens before a new uptrend line can be drawn. Like all the chart reading that is needed for a selective hedger to be effective, however, some judgment is always involved. The need for judgment bothers some producers who would like to see more objective sell and buy signals for a selective hedging program.

Selling Rallies to Contract Highs

That same 1998 July wheat chart can be used to demonstrate the opportunities associated with selling a price rally to an old life-of-contract high (Figure 2). In April 1997, when there was very little trade in this contract as evidenced by the lack of daily trading ranges, a life-of-contract high up toward 410 was established. Given that a $4.00 plus price is likely to be toward the top end of most analysts' fundamentally based probable price range for the year, producers have an excellent opportunity if they will sell a rally back up toward that contract high. Generally, it is a good idea to place a sell order 2 to 3 cents a bushel below the old high to increase the chances of having short hedges placed. One can expect a horde of sell orders sitting at or just below the resistance plane across the old life-of-contract high. The rally in late August stopped about 5 cents short of the contract high, and then the market dipped. It took another run up toward the old high in mid-October but never quite traded up to that level, falling 1.5 cents short. The turn 1.5 cents below the old high is concrete evidence that selective hedgers, speculators, processors, and exporters holding long hedges in wheat are all willing to sell a rally toward the contract high. Selling such a rally is an opportunity to place short hedges that is likely to put producers in at prices well above what typically occurs using sell signals with uptrend lines on the chart. Selling the rally requires producers to sell into a market that is trading higher as it moves up and approaches the important resistance plane across the life-of-contract high. Not all producers are able to muster the discipline to sell into a rising market. Certainly in this instance, it would have been an attractive way to proceed because it placed short hedges above 400 and very nearly at the high for the year.

Once that resistance plane approach is used to place short hedges, a support plane approach can be used to remove the short hedges. The idea is to buy back short hedges by placing buy orders 2-3 cents above the life-of-contract low, an important support plane for prices. An important support plane is at the life-of-contract lows on this chart—across the July low in the 350 area. The short hedges should be bought back at 351 or so in January, some 1.5 cents above the earlier July low at 349.50. When two consecutive closes below that plane occurred in January, the short hedges should have been replaced, but characteristics of these markets bother some producers. In this particular instance, given that it was early in the producing year, there was still a lot of uncertainty with regard to crop size and yield. The market rallied after generating the sell signal by the dips down through the old contract low support plane. Some producers would have taken those hedges off using the downtrend line discussed, and others would have suggested that the rally is just a correction of the break down from the 405 level in October down toward 345 in January. But again, judgment comes into play. If the short hedges were lifted on the rally in January and February, they should go back on when the market comes down through the new contract low around 345 in late March and early April. As was the case with the trend lines, judgment is involved with resistance and support planes, and again, some producers start to look for a more objective approach.

Figure 2. Contract Highs and Lows, July 1998 KC Wheat
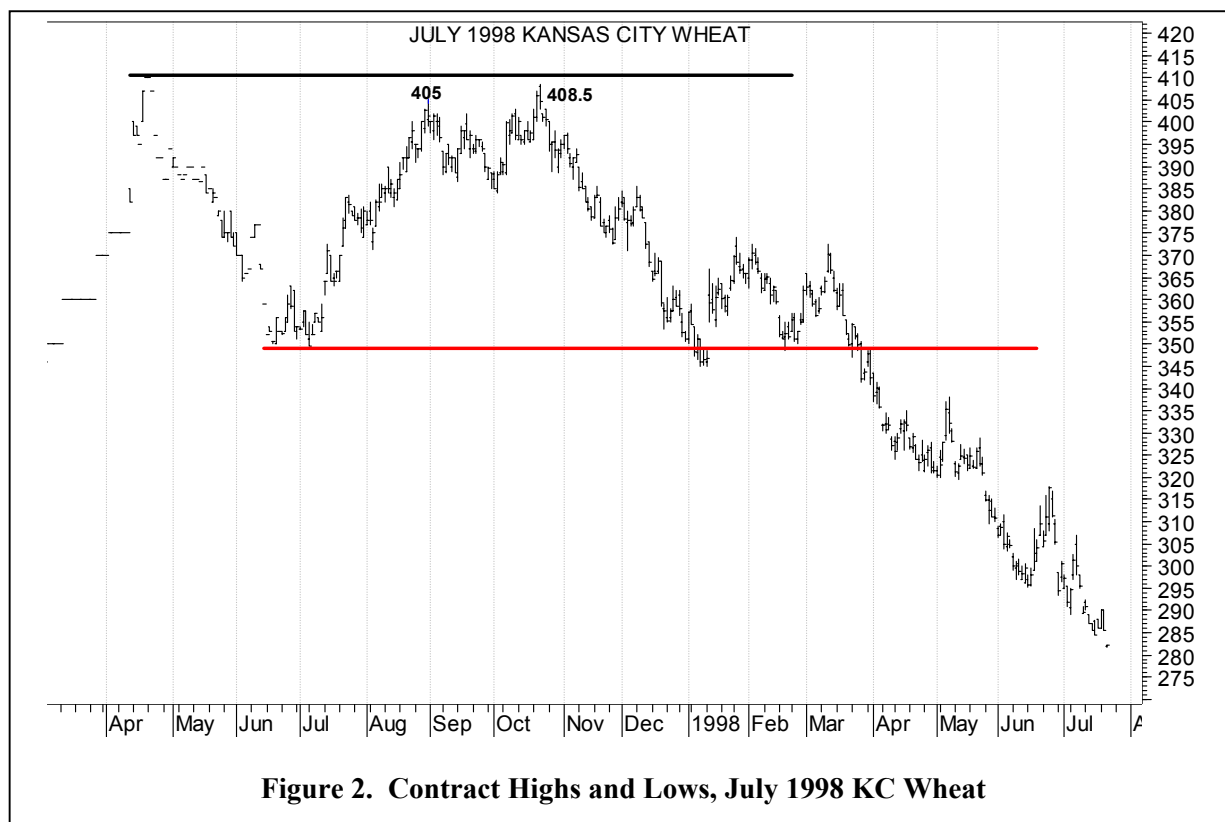
Placing Short Hedges on Market Corrections

Chart analysts expect the markets to move and often, in response to some stimulus or catalyst, move too far and then correct. A "correction" is a useful mechanism and a useful tendency on the charts for producers who miss pricing opportunities at still higher levels and are then in a mode of waiting for a correction to place short hedges. The July 1992 Kansas City wheat futures is used to demonstrate (Figure 3).

In early February, the market surges to a new life-of-contract high at 430.50. It is rather clear that some trend line possibilities on this chart could have generated sell signals sooner (back in August and September). But assume the producer did not want to sell this early in the growing season and watched the market dip down toward the 346 level in April. When the market started to rally from that 346 level, chart watchers watch for possible corrections of 38 percent, 50 percent, and 62 percent. All of those correction levels are shown on the chart. The 38 percent correction, which is the smallest correction that is typically observed, is around 378. On two occasions in early May and again in early June, the market rallied to this level and then proceeded to turn lower. After the first rally of some 38 percent that occurred in May, the next rally, of course, bumped into the new resistance plane across that early-May high. An intermediate resistance plane is not as important as the plane across the life-of-contract high, but an intermediate plane can be an important pricing objective on later price rallies. Here, the life-of-contract high was never challenged again after that 430 was recorded in early February. So, there was more than one reason to sell this market on the second rally in early June if still had concerns that prices would be forced lower through harvest. The market did, in fact, move down 50 cents a bushel after February.

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Figure 3. Market Correction Possibilities on the July 1992 KC Wheat
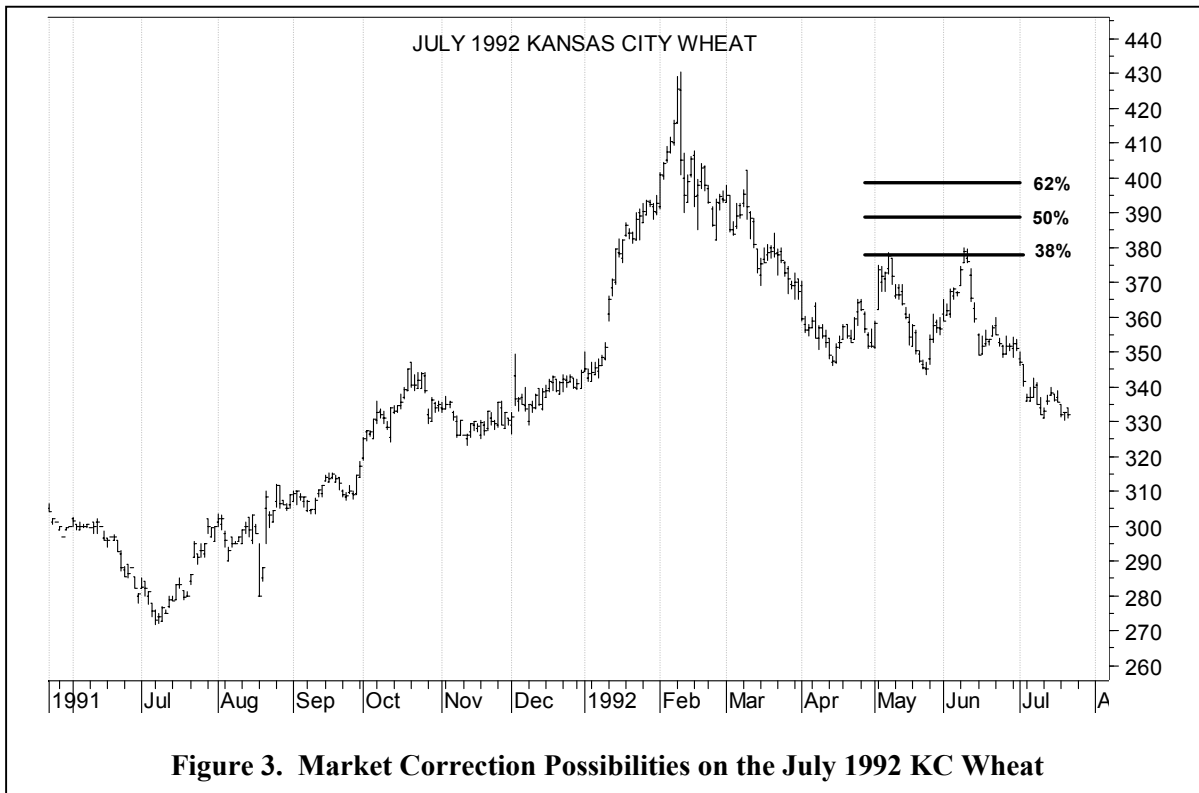
But again, some judgment is involved in all of these chart patterns. One reasonable question that a potential user would ask is, "In any particular set of circumstances, which one of the three corrections do I expect?" The answer is that it depends on how bearish the situation is. I typically look for a 50 percent correction as the most likely one, but if the market has moved down some 80 cents per bushel as fundamentals start to deteriorate, as they did in 1992 from February through April, the fundamental outlook in wheat prices is, arguably, very bearish and all the market will be able to muster is a 38 percent correction. What frustrates potential users, of course, is selling a 38 percent correction to place short hedges and then seeing the market move up to complete a 50 percent and then a 62 percent correction before turning lower--and answering the margin calls that are involved. Once again, some producers want a more objective approach to a selective hedging program.

Moving Averages in a Selective Hedging Program

A more objective approach to timing in a selective hedging program is to use moving averages. A 9-day moving average is the last 9 closing prices added and divided by 9. An 18-day moving average uses the last 18 closing prices. When prices are turning higher after a sustained price decline, the 9-day moving average will turn and will move up through the 18-day. When prices turn down from a high level, the 9-day moving average will move down through the 18-day. Buy and sell signals are generated when the shorter moving average crosses the longer moving average. Various versions of moving averages are widely used in stock and commodity markets. Here, the interest is in using two moving averages to dictate the timing of selling (placing short hedges) and buying (lifting short hedges) in a selective hedging program.

Table 2 demonstrates the 9-day and 18-day moving averages on July 2000 Kansas City wheat. Starting with October 8, 1999, for the purposes of demonstration, the closing prices are shown. As soon as there

are nine closing prices (October 20), a 9-day moving average can be calculated. The 9 closing prices are added and divided by 9. On November 2, with 18 closing prices, the 18-day moving average can be calculated. The electronic data services typically calculate moving averages for the user. At *www.britefutures.com*, one can choose any current wheat contract, specify the length of moving averages at the bottom of the page, and click on "redraw." The moving averages will then show on the chart.

Table 2. 9-Day and 18-Day Moving Averages from October 8, 1999 to November 5, 1999, July 2000 Kansas City Wheat

Date	Closing Price	Moving Averages	
		9-Day	*18-Day*
		(cents per bushel)	
October 8, 1999	308.00		
October 11	308.50		
12	312.00		
13	309.00		
14	309.00		
15	311.00		
October 18	314.50		
19	318.00		
20	311.50	311.278	
21	312.50	311.778	
22	314.00	312.389	
October 25	316.50	312.889	
26	311.75	313.194	
27	311.50	314.472	
28	311.75	313.556	
29	310.75	313.139	
November 1, 1999	308.00	312.028	
2	311.00	311.972	311.625
3	314.75	312.222	312.000
4	317.00	312.556	312.472
5	314.50	312.333	312.611

Examination of Table 2 indicates that on November 4, the 9-day moving average drops below the 18-day, generating a *sell signal.* The user can establish short positions before the close on November 4 if the close will clearly generate a sell signal, or short positions can be established the next morning. Most of my research indicates it will not make a significant difference in effectiveness whether the closing price on November 4 or the opening price on November 5 is used. At some later date, a buy signal to buy back the short hedges may be generated when the 9-day moves above the 18-day.

The moving averages can be calculated as soon as enough closing prices are available. Figure 4 shows the 9 and 18-day moving averages on the July 2000 contract. A sell signal is generated early on April 12 in 1999 at a closing price of 339.00. These short hedges are bought back on May 19 at a closing price of 325.00. Another sell signal is generated May 21 at 326.50. These short hedges are bought back on June 7 at 334.00. The next sell signal is June 23 at 327.00. Those short hedges are bought back at 318.00 on July 27. The selling and buying based on the moving average signals can be started as soon as the contract starts trading, started after harvest of the prior year, or some other rule can be used. My preference would be to start with the first sell signal after the prior harvest, but once the system is started, it can be monitored and used until the upcoming harvest.

Figure 4. Demonstration of the 9-Day and 18-Day Moving Averages on the July 2002 KC
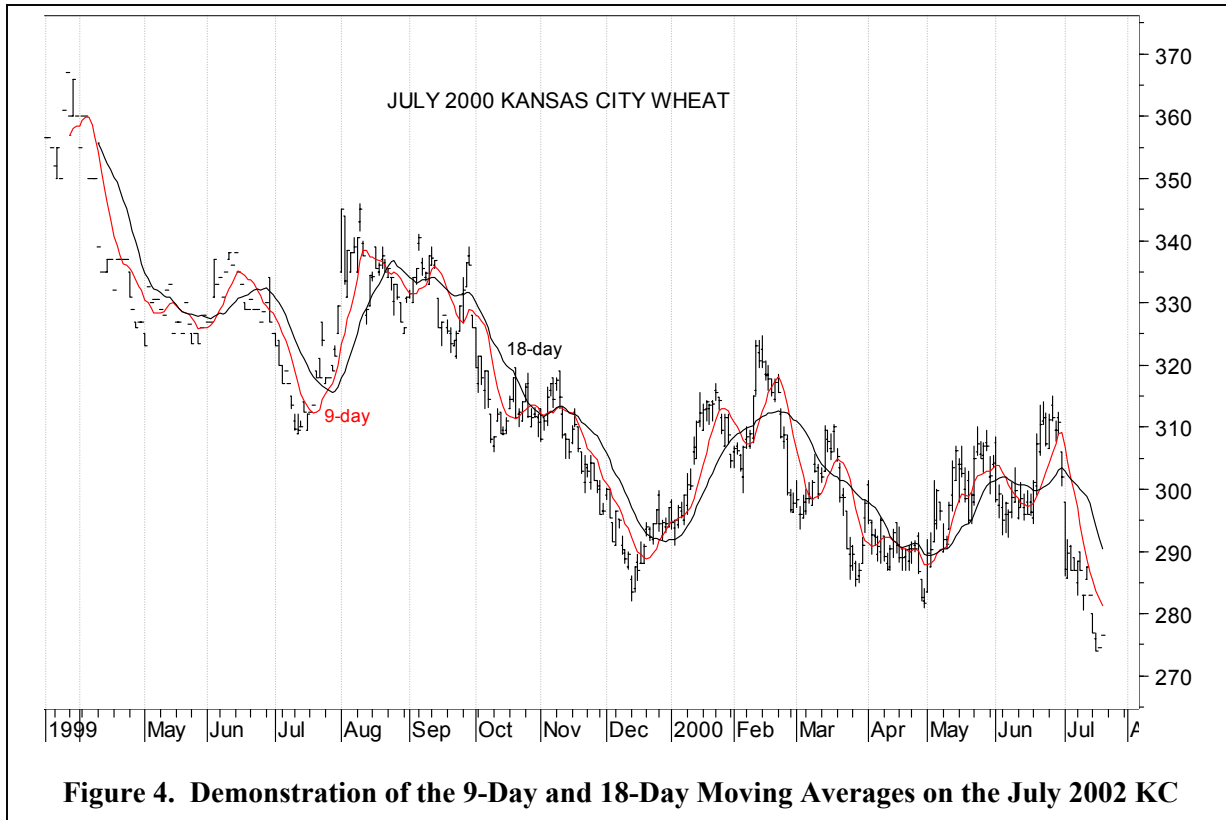
Table 3 shows the date short hedges are placed, the dates they are removed, and the net gain or loss before commissions for the entire year. As I implied above, most producers would not start using the system as early as May 1999, and short hedges would be bought back by most producers before the last day of trade on July 20. For the entire dataset, 12 round turn (sell and later buy back) trades were generated with a net gain of 5.50 cents after deducting 1.0 cents per bushel per round turn (sell and later buy back) in commissions.

The results for the 2000 contract show the strengths and weaknesses of a moving average system, and I selected this contract because it demonstrates both. A sustained move down in price from September through December requires that the producer be protected in the event the market continues to trend lower. The 9/18 system generated a sell signal on September 20 at 325.25, but then made a "mistake" in late October by prematurely signaling a "bottom" in the market. Actually, the market corrected to the upside for several days and then continued lower. Later in the year, when the market turned volatile and choppy, several losing round turns were generated and the system lost most of its earlier gains. Upon examination of the outcomes using the 9/18 moving average system, the default system in many electronic services, an immediate question comes to mind:

Table 3. Effect of 9-Day and 18-Day Moving Averages on Gains and Losses on July 2000 Kansas City Wheat			
Date	*Action*	*Closing Price (¢/bu)*	*Net Trade (¢/bu)*
04/12/99	Sell (S)	339.00	
05/19/99	Buy (B)	325.00	14.00
05/21/99	S	326.50	
06/07/99	B	334.00	-7.50
06/23/99	S	329.00	
07/27/99	B	318.00	11.00
08/23/99	S	335.50	
09/10/99	B	337.50	-2.00
09/20/99	S	325.50	
10/27/99	B	311.50	14.00
11/05/99	S	314.50	
11/12/99	B	306.00	8.50
11/16/99	S	310.50	
12/28/99	B	294.75	15.75
02/03/00	S	303.25	
02/14/00	B	320.50	-17.25
02/28/00	S	296.75	
03/16/00	B	306.00	-9.25
03/27/00	S	289.50	
05/05/00	B	296.50	-7.00
06/06/00	S	297.75	
06/21/00	B	310.50	-12.75
07/07/00	S	287.00	
07/20/00	Closeout	276.50	10.50
Net before commissions: 17.50 cents			
Net after commissions: 5.50 cents			

The Research Results

Will some other set of moving averages handle these Kansas City wheat markets better and generate a more profitable selective hedging system? This question above prompted a major research effort to search for the optimal set of moving averages for Kansas City July wheat. In this section, each of the July Kansas City wheat contracts from 1990 through 2000 is analyzed. I look at the optimal set of moving averages, the one that has the biggest after-commission profits from the 1990s, and the 9-day and 18-day "default" set as a comparison. The optimal set was the 10-day and 61-day moving averages with a 2-cent penetration requirement. One of the weaknesses in moving average systems is to issue premature sell signals before a top in the market is in place, or premature buy signals before a bottom is in place. Such weaknesses were apparent in the 2000 July wheat contract: when the market turned choppy and volatile late, several losing round turns were generated. Using a penetration rule helps eliminate some of these frequent and often losing trades. Every combination of moving averages from 2 up to 70 was tested with penetration requirements of 0, 0.25, 0.50, 1.0, and 2.0 cents for each moving average combination. The optimal set, the 10/61 and 2-cent penetration, requires that the 10-day moving average be *below* the 61-day by 2.0 cents or more to confirm a sell signal, be *above* the 61-day by 2.0 cents or more to confirm a buy signal. This section reviews the results by date of transactions, number of trades, and before and after commission profits.

The objective of moving averages as a guide to a selective hedging system is to have protection in place when there is a sustained and potentially ruinous down turn in prices and to be off short hedges, exposed to the cash market, when there is a sustained up turn in prices. The moving averages used in the research effort and reviewed for each year 1990 through 2000 are reviewed with this objective in mind. How effective was the protection during years in which prices went down, and how effective were the systems in keeping producers off short hedges during years when the price trend was to higher prices? I will come back to these questions later after each year has been reviewed and look at effectiveness in the years when price trends were up and down and also review the years in which the moving averages systems were not effective in meeting the stated objective.

The early 1990s contracts did not start trading until 12 months or sometimes less before contract maturity. It takes 61 closing prices on the July futures contract to calculate the needed 61-day moving average, and this calculation was not possible in some of the early years until well after harvest of the prior year. To be consistent across all years, I started with November 1 which allowed a 61-day moving average calculation on most contracts and established short hedges at the close of the July futures on November 1 if the 10-day was below the 61-day by 2 cents or more, or at the first sell signal after November 1 if the 10-day was above the 61-day on November 1. The same approach was used for the 9-day and 18-day moving averages. If the 9-day was already below the 18-day, a short position was established at the close on November 1.

In the yearly reviews that follow, the term "short" is used to denote the first placement of short hedges when a short position was being called for by the moving averages and the penetration rule for the 10/61 system on November 1. If the first indication in the table reads "sell," the moving average system was long (10 above the 61 by more than 2.0 cents on November 1) and the first hedges were placed on a sell signal after November 1.

At the close of each year, the short hedges are either bought back by a buy signal from the moving averages or, if no buy signal has been generated, the short hedges are closed out at the closing price on July 10. The term "closeout" will appear in the tables when the short hedges are still in place on July 10.

In the reviews, the words sell and buy are used for the first transactions, and then "s" and "b" are used to stand for sell and buy respectively. The terminology will be clear after one or two of the annual reviews are studied. On all of the charts, the shorter moving average is shown in red. The use of color to make the crossing action as clear as possible suggests the manuscript should be printed in color if possible.

In reviewing the results, remember, I will stick to cents per bushel in identifying the levels at which hedges are placed and bought back and in referring to a specific price level on the charts. Wheat is traded in cents per bushel, but most producers think in terms of dollars per bushel, so I will sometimes move into use of dollars per bushel when discussing price levels in general and when there is no specific reference to one of the futures charts.

Table 4. Transaction Dates, Prices, and Net for Each Round Turn Trade in a Short-Only Selective Hedging Program for Kansas City July Wheat, 1990			
Date	**Action**	**Closing Price (¢/bu)**	**Net Trade (¢/bu)**
9/18 System with No Penetration Rule			
11/01/89	Short	352.00	
11/09/89	Buy (B)	360.25	-8.25
12/08/89	Sell (S)	365.50	
12/21/89	B	370.00	-4.50
01/05/90	S	370.50	
01/10/90	B	369.00	1.50
01/17/90	S	366.75	
03/23/90	B	348.25	18.50
04/04/90	S	351.50	
04/12/90	B	346.50	5.00
04/26/90	S	344.50	
05/02/90	B	354.25	-9.75
05/18/90	S	344.75	
07/10/90	Closeout	303.75	41.00
	Overall gain:	43.50 ¢	
	Gain less commissions:	36.50 ¢	
10/61 and 2-Cent Penetration System			
11/01/89	Short	352.00	
11/14/89	B	360.00	-8.00
01/26/90	S	358.25	
05/08/90	B	356.00	2.25
05/24/90	S	332.00	
07/10/90	Closeout	303.75	28.25
	Overall gain:	22.50 ¢	
	Gain less commissions:	19.50 ¢	

1990 Review

Both moving average systems were in a sell position with the shorter moving average below the longer one on November 1, thus the use of "short" as described on page 12. The 9/18 (9-day in red) moving average's improved performance came primarily because of the quicker entry to short positions on May 18 at a closing price of 344.75 (Figure 5). That position was in place until the closeout on July 10 at 303.75 and the 9/18 generated 36.50 cents after commissions.

The 10/61 (10-day in red) with the 2-cent penetration requirement was slower to enter the market short during May. A confirmed signal was not generated until May 24 at a closing price of 332 (Figure 6). The intent behind the 10/61 and 2-cent penetration requirement is to eliminate frequent and losing trades. This year was not characterized by a great deal of sideways, choppy action, and the slowness with which the 10/61 system signaled short hedges hurt performance. The 10/61 recorded after commission gains of 19.50 cents.
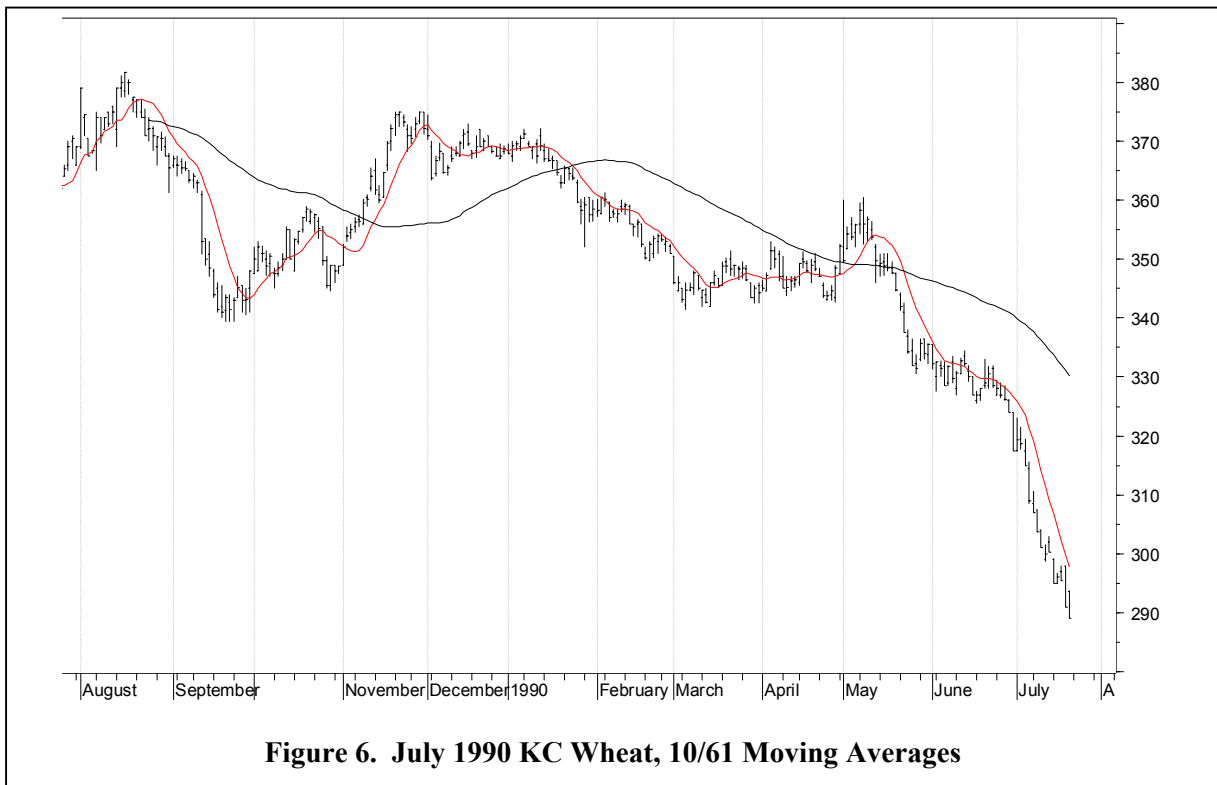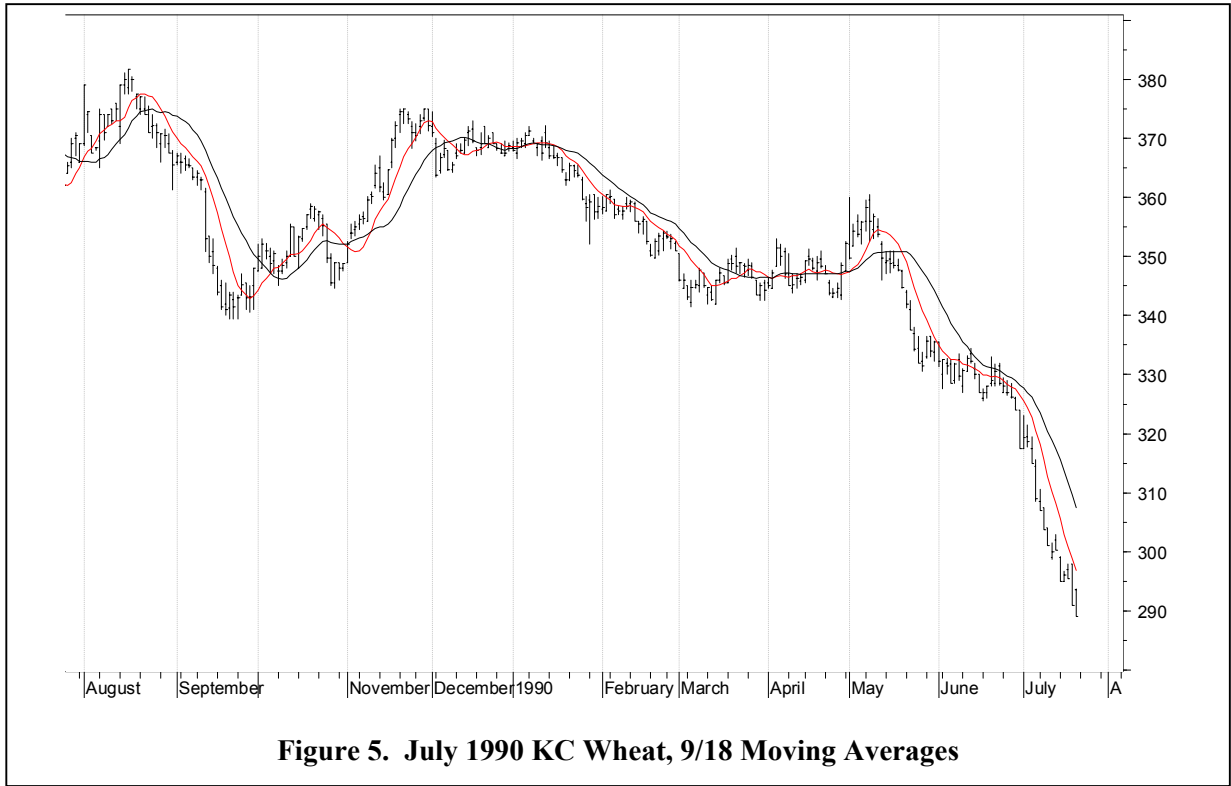
Figure 5. July 1990 KC Wheat, 9/18 Moving Averages

Figure 6. July 1990 KC Wheat, 10/61 Moving Averages

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		Closing Price	Net Trade
Date	**Action**	**(¢/bu)**	**(¢/bu)**
9/18 System with No Penetration Rule			
11/01/90	Short	283.75	
11/08/90	Buy (B)	292.75	-9.00
11/19/90	Sell (S)	278.00	
12/12/90	B	276.50	1.50
12/24/90	S	276.00	
01/28/91	B	273.00	3.00
02/15/91	S	275.75	
02/25/91	B	274.75	1.00
03/25/91	S	292.25	
04/01/91	B	300.50	-8.25
04/18/91	S	290.00	
05/13/91	B	296.00	-6.00
05/31/91	S	287.00	
07/10/91	Closeout	266.00	21.00
Overall gain: 3.25 ¢			
Gain less commissions: -4.25 ¢			
10/61 and 2-Cent Penetration System			
11/01/90	Short	283.75	
02/26/91	B	277.00	6.75
06/07/91	S	290.75	
07/10/91	Closeout	266.00	24.75
Overall gain: 31.50 ¢			
Gain less commissions: 29.50 ¢			

Table 5. Transaction Dates, Prices, and Net for Each Round Turn Trade in a Short-Only Selective Hedging Program for Kansas City July Wheat, 1991

1991 Review

The charts (Figures 7 and 8) show a sometimes choppy market that has the potential to generate losing trades for moving average systems. Losing trades by the 9/18 demonstrate the problems in choppy markets with not sustained trends. The initial short position established in accordance with the rule on November 1 lost 9 cents. Two additional losing trades occurred for the 9/18 during April and May.

The 10/61 was also given a short position on November 1. This particular contract started trading so late in the year that a 61-day moving average really could not be calculated until early December, but the same short position attributed to the 9/18 was also attributed to the 10/61 at 283.75 cents. The 10/61 system generated a confirmed buy signal to remove those short hedges on February 26 at a closing price of 277.00. The penetration requirement before another sell signal would be taken was not met until June 7 at 290.75. The system was closed out on July 10 at a closing price of 266.00. The 10/61 system was far superior in this year to the 9/18, generating after-commissions additional revenue of 29.5 cents per bushel as compared to a loss of 4.25 cents per bushel with the 9/18.
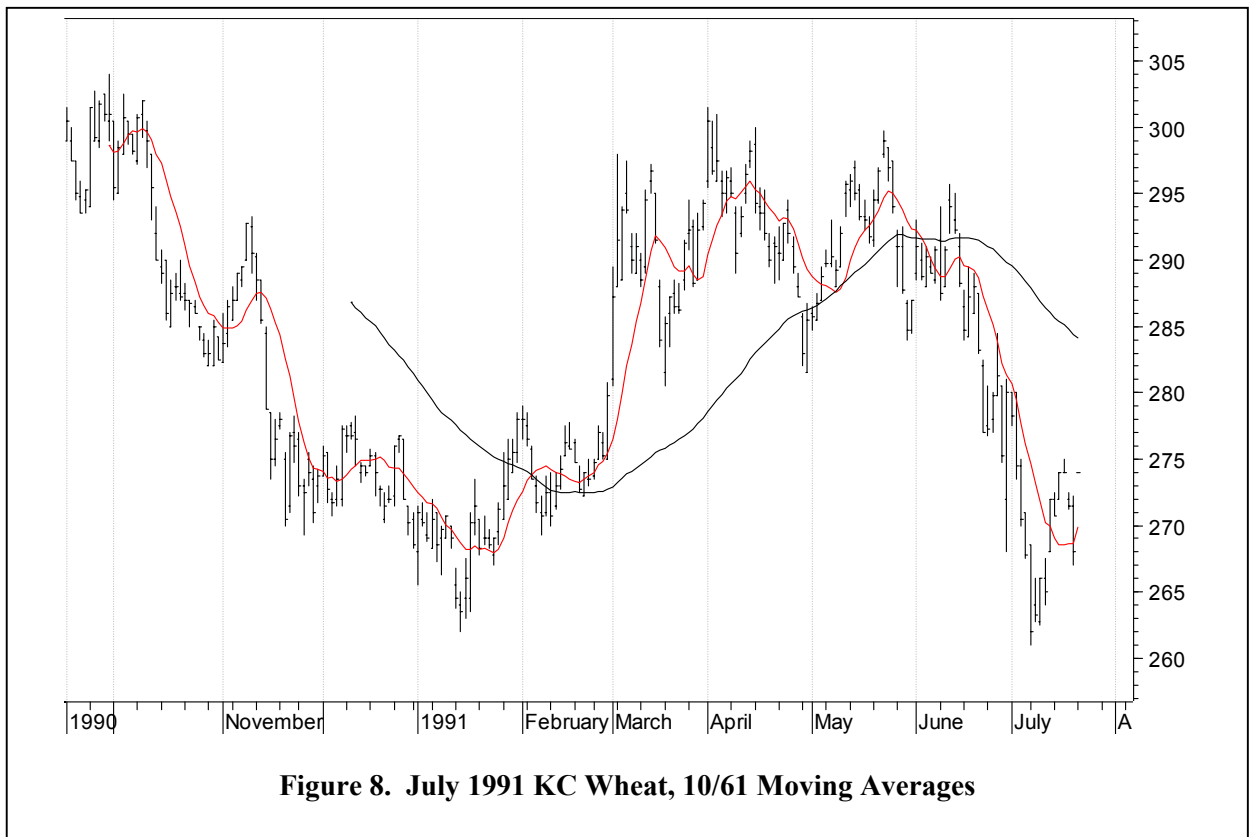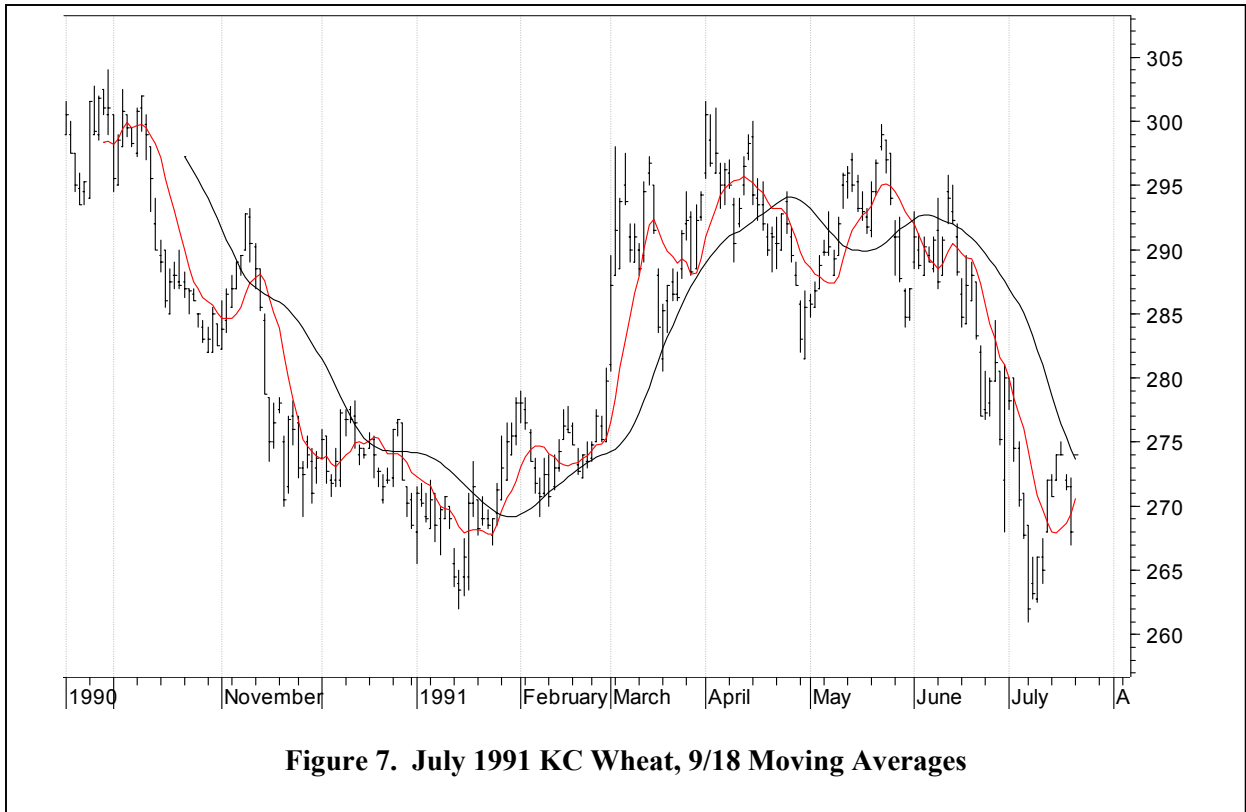
Figure 7. July 1991 KC Wheat, 9/18 Moving Averages

Figure 8. July 1991 KC Wheat, 10/61 Moving Averages

Table 6. Transaction Dates, Prices, and Net for Each Round Turn Trade in a Short-Only Selective Hedging Program for Kansas City July Wheat, 1992			
Date	Action	Closing Price (¢/bu)	Net Trade (¢/bu)
9/18 System with No Penetration Rule			
11/04/91	Sell (S)	335.00	
11/27/91	Buy (B)	332.50	1.50
02/24/92	S	393.00	
04/27/92	B	362.00	31.00
05/20/92	S	347.50	
06/04/92	B	368.00	-20.50
06/19/92	S	356.75	
07/10/92	Closeout	332.00	24.75
Overall gain: 37.75 ¢			
Gain less commissions: 33.75 ¢			
10/61 and 2-Cent Penetration System			
03/23/92	S	378.00	
06/09/92	B	379.00	-1.00
06/23/92	S	352.25	
07/10/92	Closeout	332.00	30.25
Overall gain: 29.25 ¢			
Gain less commissions: 27.25 ¢			

1992 Review

This year brought a relatively strong uptrend in price, up into the $4.30 per bushel area in February. Producers would want the moving average systems to avoid short hedges as long as the trend is strongly higher to eliminate margin call problems and to allow producers to benefit from the increasing cash prices. The 9/18 generated a sell signal shortly after the start date of November 1 on November 4 and generated a buy signal at a small profit later in the month (Figure 9). The big move in this market to the downside came during February, March, and April. The 9/18 generated a sell signal on February 24 and a buy signal on April 27 for a gross gain of 31.00 cents. During the choppy action of late May and June, the 9/18 moving average system had difficulties and lost 20.50 cents on the trade that was generated from May 20 to June 4. The system was short when the closeout occurred on July 10.

The 10/61, as should be anticipated, did not trade as often and was slower to generate confirmed sell signals. The first confirmed signal came on March 23 at a closing price of 378.00 (Figure 10). That trade was closed at a small loss on June 9. The system then replaced short hedges at 352.25 on June 23 and generated an overall gain of 29.25 cents at the closeout on July 10. Overall gains after commissions were 27.25 cents for the 10/61 system, below the 33.75 generated by the 9/18 but quite effective performance. There would be 27.25 cents added to the producers selling price in late June or early July, and the futures price equivalent on July 10 would have been $3.32 plus the 27.25 cents or $3.59. For the 9/18, the futures price equivalent was even better at nearly $3.66.
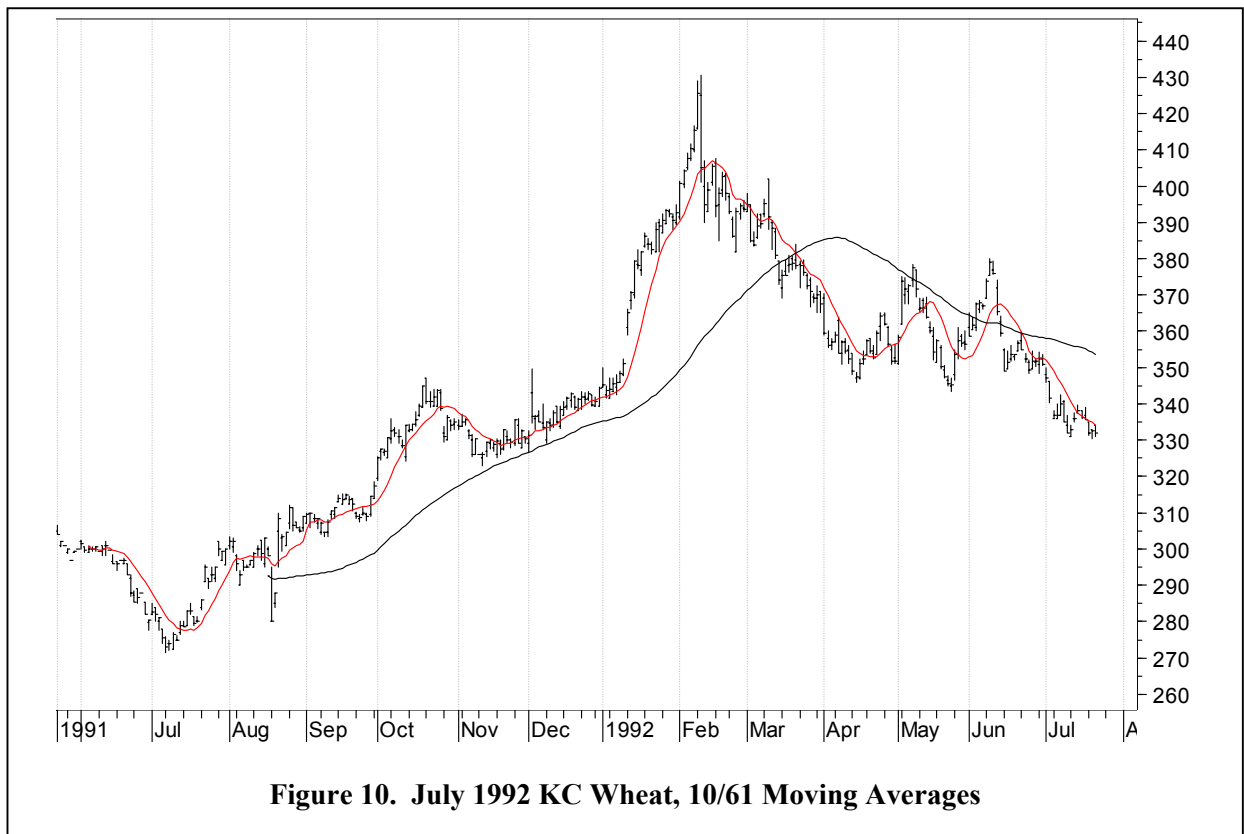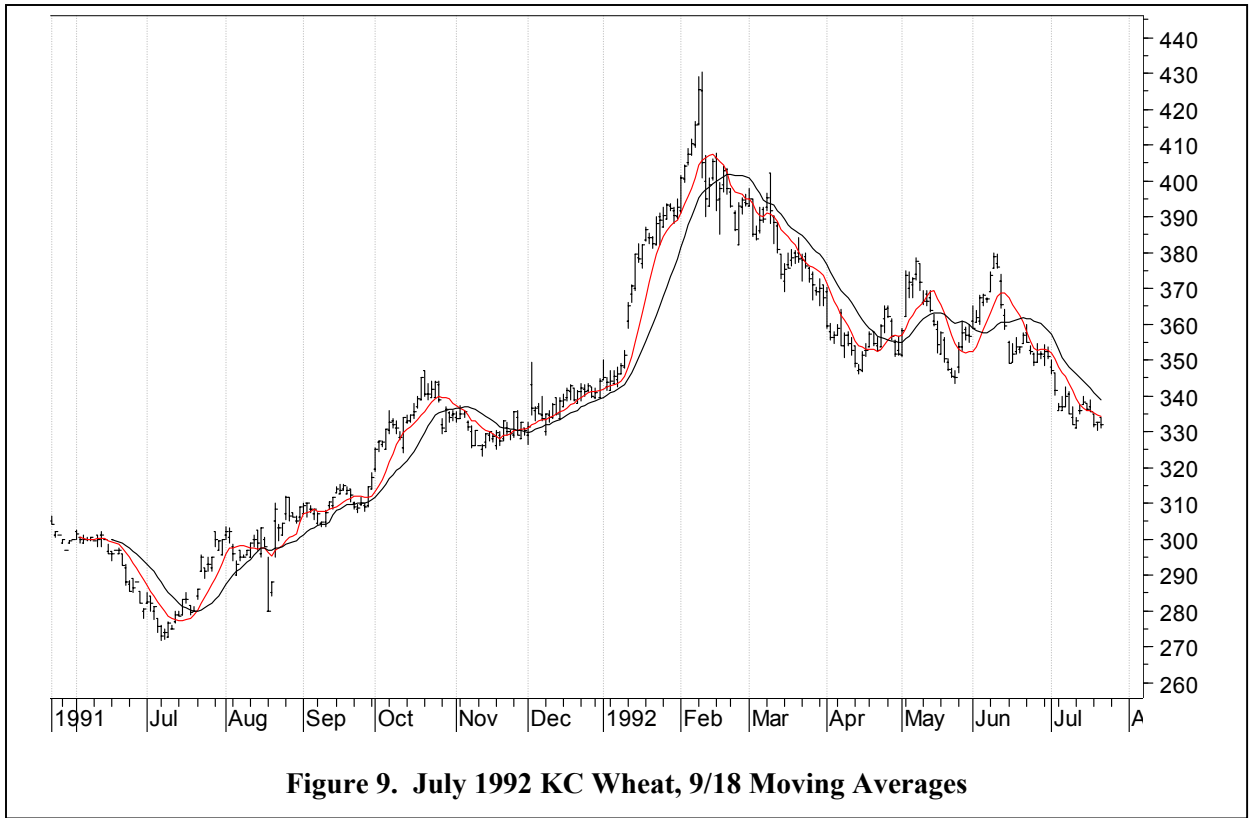
Figure 9. July 1992 KC Wheat, 9/18 Moving Averages

Figure 10. July 1992 KC Wheat, 10/61 Moving Averages

Table 7. Transaction Dates, Prices, and Net for Each Round Turn Trade in a Short-Only Selective Hedging Program for Kansas City July Wheat, 1993			
Date	Action	Closing Price (¢/bu)	Net Trade (¢/bu)
9/18 System with No Penetration Rule			
11/02/92	Short	321.00	
11/10/92	Buy (B)	321.00	0.00
12/09/92	Sell (S)	320.00	
01/11/93	B	318.50	1.50
02/02/93	S	317.25	
04/05/93	B	308.75	8.50
04/26/93	S	299.25	
05/20/93	B	299.00	0.25
06/02/93	S	289.50	
07/01/93	B	290.75	-1.25
Overall gain: 9.25 ¢			
Gain less commissions: 4.25 ¢			
10/61 and 2-Cent Penetration System			
11/02/92	Short	321.00	
11/19/92	B	326.25	-5.25
12/22/92	S	313.00	
01/19/92	B	330.75	-17.75
02/08/93	S	314.50	
07/09/93	Closeout	305.00	9.50
Overall gain: -13.50 ¢			
Gain less commissions: -16.50 ¢			

1993 Review

The charts indicate, after the start of the decision period on November 1, a choppy market with no sustained and major price moves (Figures 11 and 12). The price range was from 330 down to 280 and then came abrupt price rallies in early July that typically come in association with either a government report that indicates yields will be lower than had been expected or some other outside influence. The 9/18 generated five round-turn trades with the initial short position being established at 321.00 on November 2 since November 1 occurred on Sunday. The 9/18 closed that trade at with no gain before commissions and was able to generate only modest gains through the year.

The 10/61, in 1993, was less effective, lifting the short hedge established on November 2 at a small loss and then incurring another loss after the sell signal that was confirmed on December 22 (Figure 12). The buy-back occurred in the middle of January at a loss of 17.75 cents. The chart indicates a market that is moving but in choppy-type behavior as compared to a sustained move. The 10/61 lost 16.5 cents after commissions. With a harvest-period price near $3.05 for the July futures prices, this performance is not impressive since it would drop the futures price equivalent down toward $2.885 ($3.05 - 0.165).
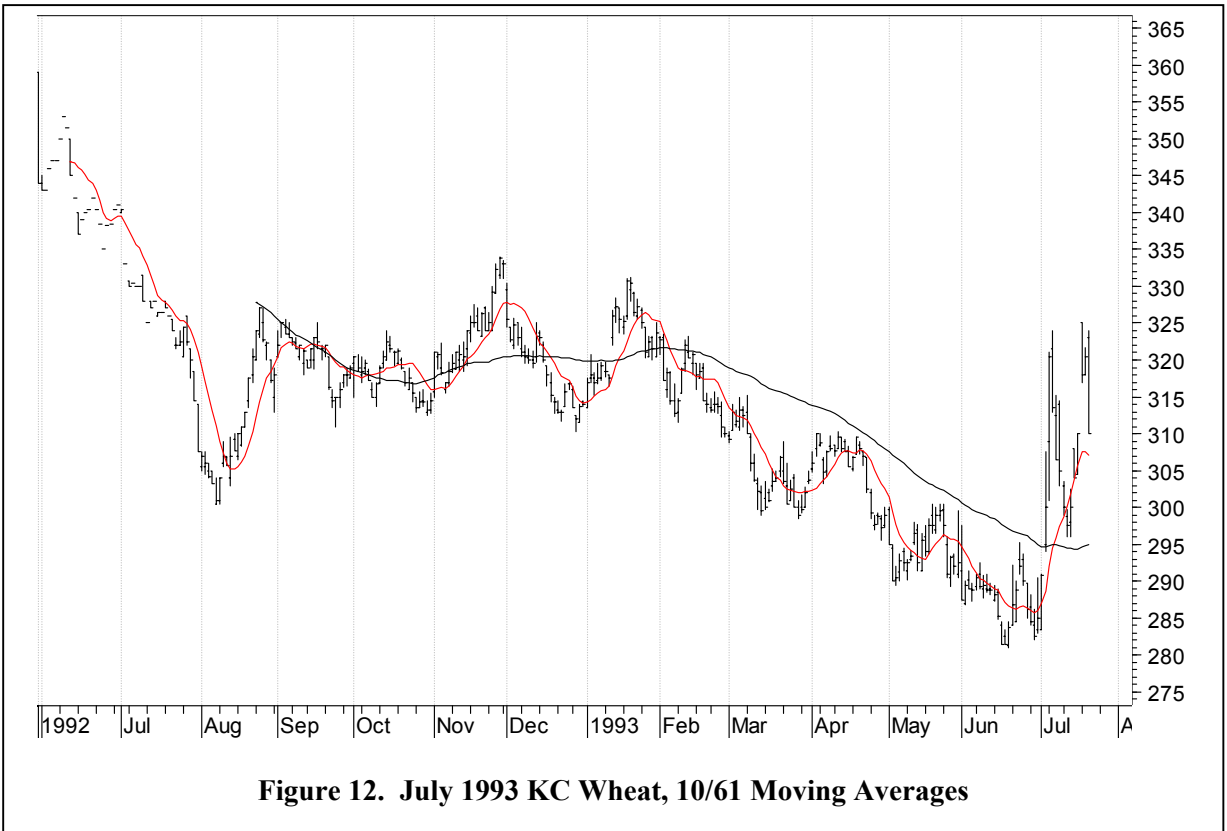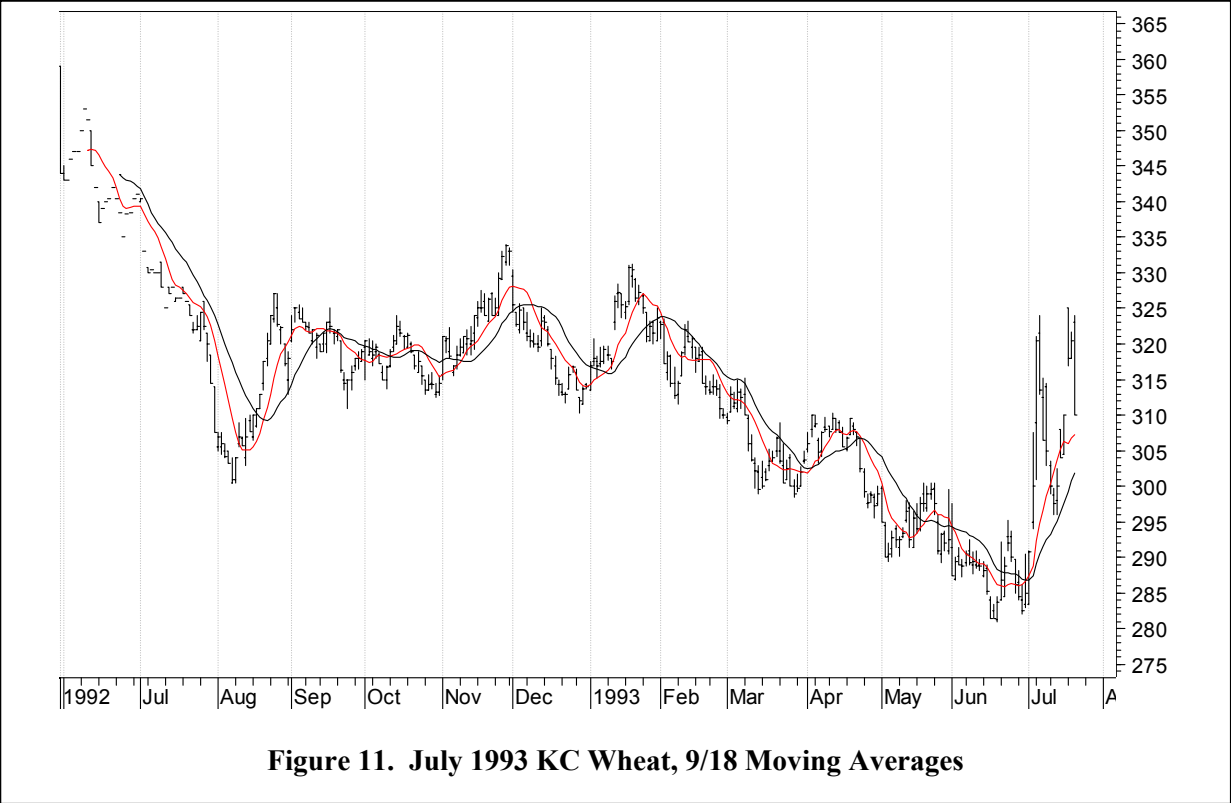
Figure 11. July 1993 KC Wheat, 9/18 Moving Averages

Figure 12. July 1993 KC Wheat, 10/61 Moving Averages

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Table 8. Transaction Dates, Prices, and Net for Each Round Turn Trade in a Short-Only Selective Hedging Program for Kansas City July Wheat, 1994			
Date	Action	Closing Price (¢/bu)	Net Trade (¢/bu)
9/18 System with No Penetration Rule			
11/01/93	Short	307.00	
11/02/93	Buy (B)	310.25	-3.25
01/21/94	Sell (S)	337.00	
02/09/94	B	347.25	-10.25
02/24/94	S	339.50	
03/31/94	B	323.75	15.75
04/15/94	S	316.00	
05/03/94	B	331.00	-15.00
05/18/94	S	327.25	
05/25/94	B	331.50	-4.25
06/24/94	S	327.75	
07/11/94	Closeout	330.25	-2.50
Overall gain: -19.50 ¢			
Gain less commissions: -25.50 ¢			
10/61 and 2-Cent Penetration System			
03/03/94	S	331.00	
05/25/94	B	331.50	-0.50
Overall gain: -0.50 ¢			
Gain less commissions: -1.50 ¢			

1994 Review

The charts suggest (Figures 13 and 14) 1994 was a potentially difficult year with a major move up in price during the last few months of 1993 and then a choppy, volatile segment in the March, April, and May period near harvest. The 9/18 generated only one positive round-turn trade during this entire time period. That gain was associated with the February 24 to March 31 trade. The short position attributed to the system since the 9-day was below the 18-day on November 1, started the streak of relatively small losses from which it was difficult to recover. Overall gains were -25.5 cents for the 9/18 after commissions.

The 10/61 would have kept the producer off short hedges from the November 1 start date (the system was long on November 1 with the 10 above the 61) until early March. The system basically ignored the choppy action December through February at prices as high as 350 to 355, generated a confirmed sell signal on March 3, and then bought those short hedges back on a confirmed buy signal on May 25. The early July dip by the 10-day down through the 61-day did not match the 2-cent penetration rule, so no additional short hedges were placed. This system basically left the producer in a position of early July futures prices that ranged from 325 up to 330-340, with only a nominal 1.50 cent loss after commissions. Overall, the minimal loss was an effective final result since the 325-345 July futures during harvest in early July would have been a decent price for the producer.
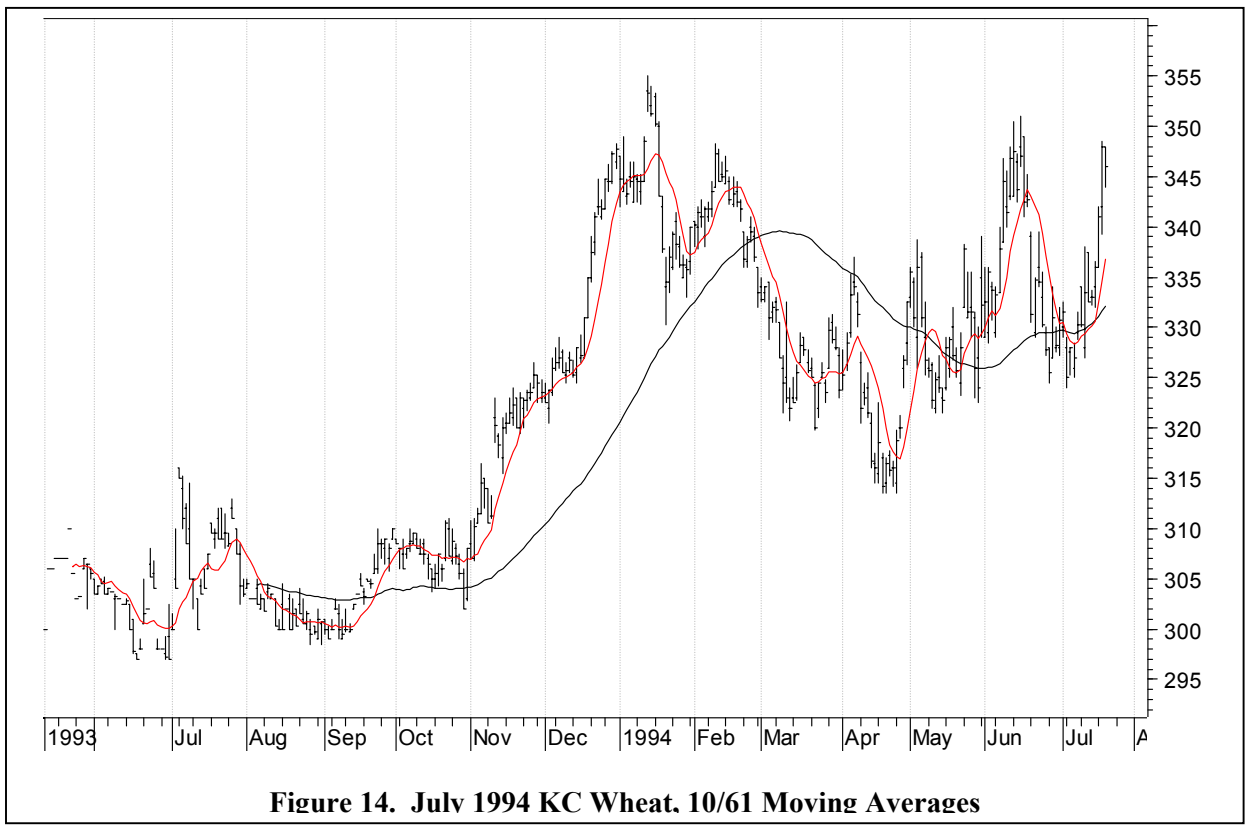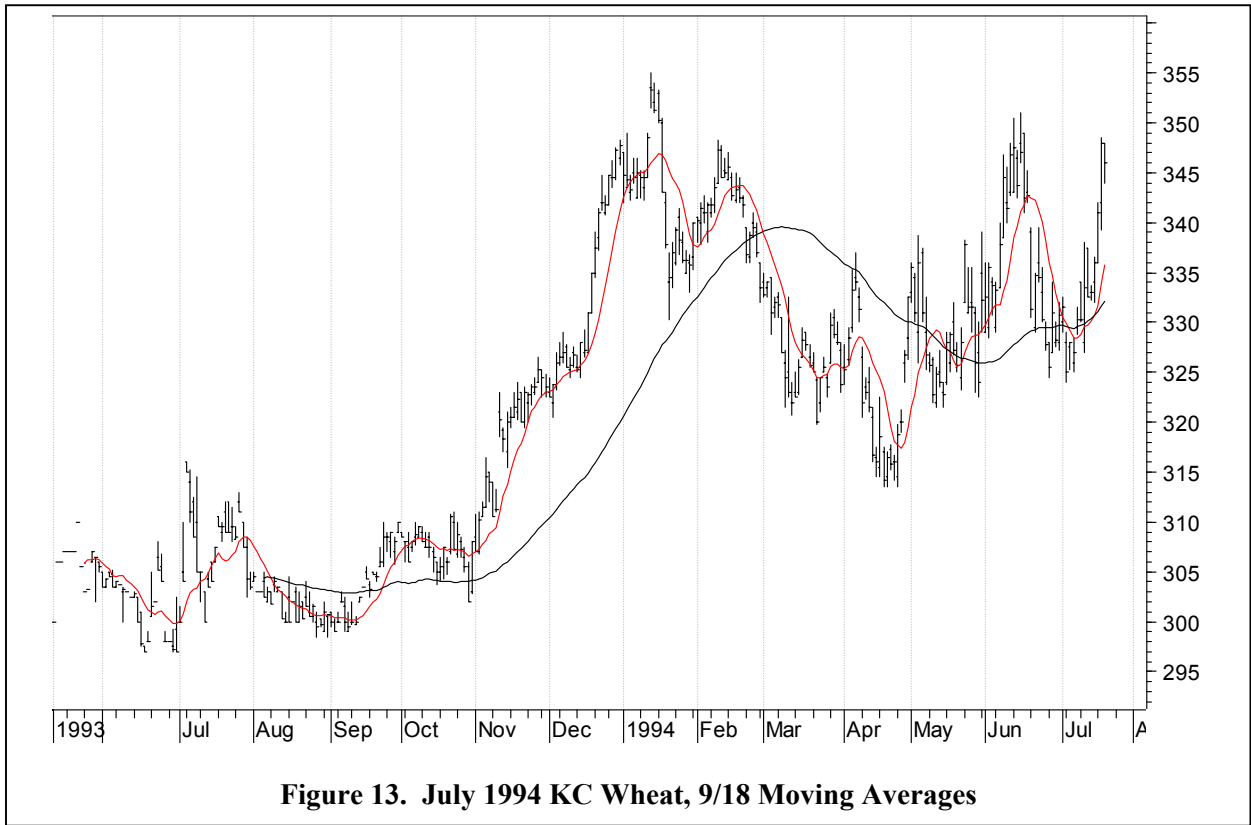
Figure 13. July 1994 KC Wheat, 9/18 Moving Averages

Figure 14. July 1994 KC Wheat, 10/61 Moving Averages

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Table 9. Transaction Dates, Prices, and Net for Each Round Turn Trade in a Short-Only Selective Hedging Program for Kansas City July Wheat, 1995			
Date	Action	Closing Price (¢/bu)	Net Trade (¢/bu)
9/18 System with No Penetration Rule			
11/01/94	Short	351.75	
12/02/94	Buy (B)	350.50	1.25
01/11/95	Sell (S)	346.00	
02/13/95	B	343.25	2.75
02/27/95	S	341.00	
03/20/95	B	347.00	-6.00
Overall gain: -2.00 ¢ Gain less commissions: -5.00 ¢			
10/61 and 2-Cent Penetration System			
11/07/94	S	350.50	
03/31/95	B	344.75	5.75
Overall gain: 5.75 ¢ Gain less commissions: 4.75 ¢			

1995 Review

It is important to study the charts (Figures 15 and 16) before reviewing the performance of the moving averages during 1995. This market traded sideways for several months. As it entered the decision period November 1, it continued that sideways pattern with prices in the 340-360 range and only minimal moves up and down into April. Then the market started to push up, reflecting a relatively short crop during the year and the prospects for sharply higher corn prices. It then moved above the $5.00 level and higher as the July futures reached maturity. The producer would like to see in a year like this little, if any, subtraction from the obvious gains in a cash market that was well above $4.50 in most producing areas in late-June and early-July at harvest time. With that interest in mind, both systems were quite effective. The 9/18 generated three round-turn trades and lost, after commissions, only 5.0 cents during the year. A small 5.0 cent loss is admirable performance in that downside protection would have been in place had the supply-demand fundamentals not justified sharply higher prices and the producer, as a selective hedger, would have benefited from most of the increase in cash market prices.

The performance of the 10/61 is even better than the 9/18. The system only generated one round-turn trade during the year: a sell signal to place short hedges on November 7. The system then ignored all the choppy action until the market started to move up and bought those hedges back at a small gain at the end of March 1995. The system was never short in the strong up-move that occurred from March to July and showed revenues after commissions of 4.75 cents. Much more importantly, it gave the entire benefit of the strong up-move in prices during the year to the producer. A producer interested in managing exposure to price risk to have protection when the price trend is down and to benefit when the price trend is up would have been pleased with either set of moving averages. The $5.00 futures in July would generate a $4.75 cash price for producers using the moving averages as guides to a selective hedging strategy. Cash contracts or short hedges placed with the July futures in the $3.50 area prior to June would have eliminated the benefits of the surge in wheat prices and brought significant margin calls if the short futures positions were held until harvest.
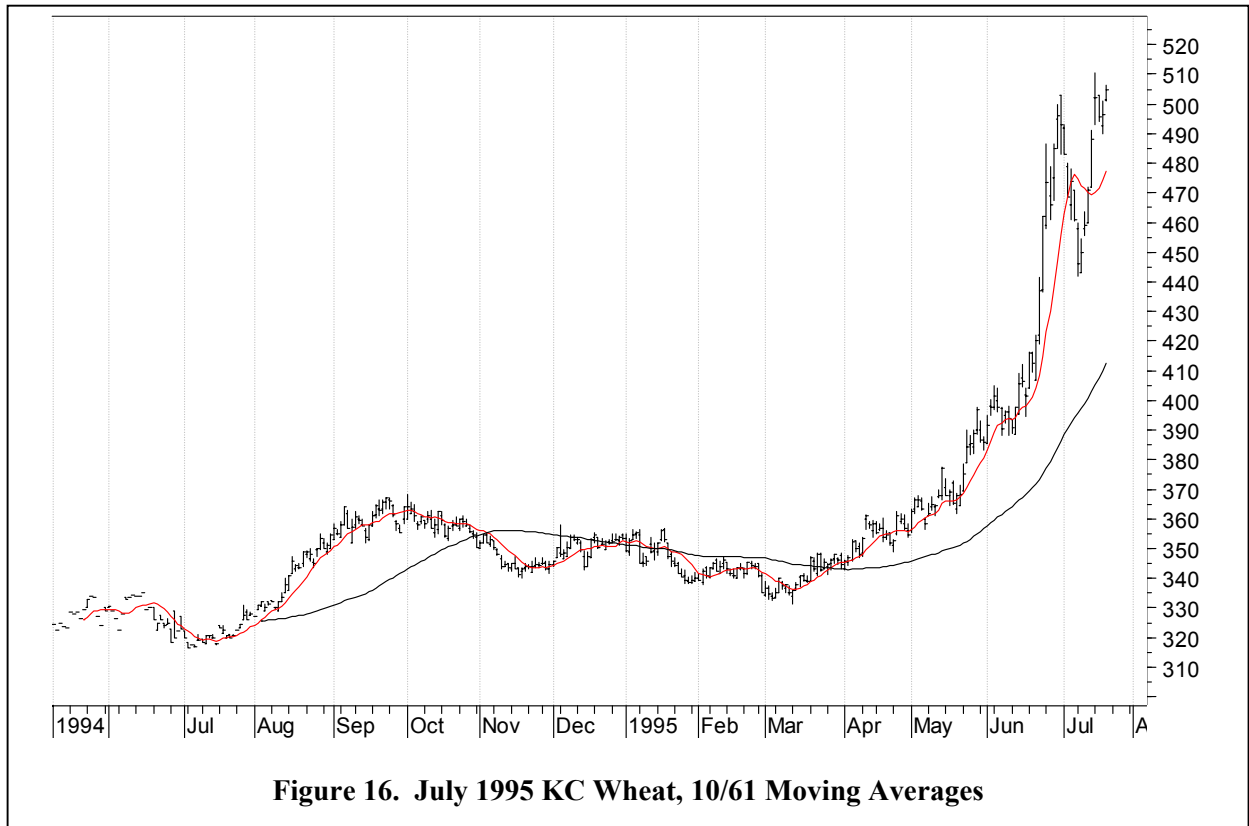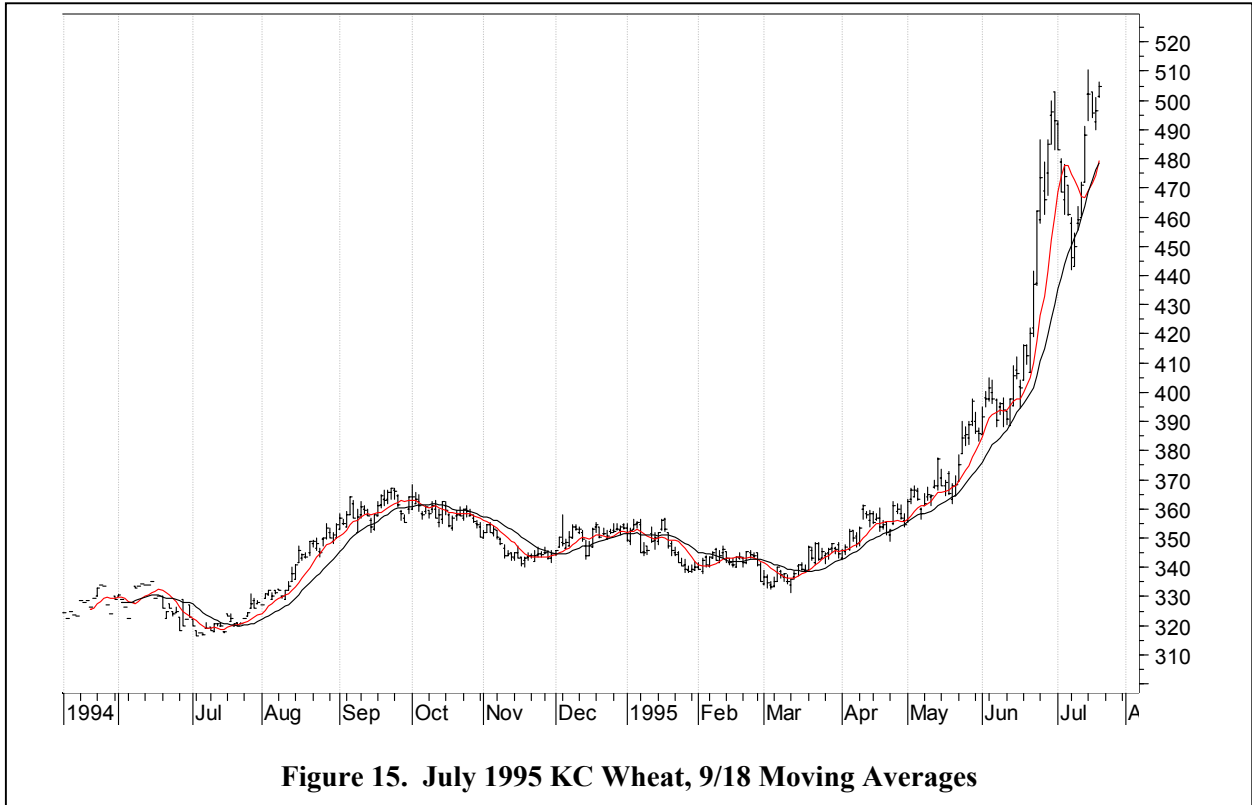
Figure 15. July 1995 KC Wheat, 9/18 Moving Averages

Figure 16. July 1995 KC Wheat, 10/61 Moving Averages

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		Closing Price	Net Trade
Date	**Action**	**(¢/bu)**	**(¢/bu)**
Table 10. Transaction Dates, Prices, and Net for Each Round Turn Trade in a Short-Only Selective Hedging Program for Kansas City July Wheat, 1996			
9/18 System with No Penetration Rule			
11/06/95	Sell (S)	438.00	
12/05/95	Buy (B)	443.75	-5.75
01/15/96	S	444.00	
01/30/96	B	466.00	-22.00
03/15/96	S	466.00	
03/29/96	B	504.25	-38.25
05/24/96	S	627.00	
06/19/96	B	589.00	38.00
06/28/96	S	552.25	
07/10/96	Closeout	536.25	16.00
Overall gain: -12.00 ¢			
Gain less commissions: -17.00 ¢			
10/61 and 2-Cent Penetration System			
06/07/96	S	576.00	
07/10/96	Closeout	536.25	29.75
Overall gain: 29.75 ¢			
Gain less commissions: 28.75 ¢			

1996 Review

To an extent, 1996 was a repeat of 1995, albeit at higher price levels. The charts (Figures 17 and 18) indicate strong moves up during the trading period from $3.50 up toward $7.00 in April and May. Record-high wheat prices occurred during the spring months of 1996.   Coming off a relatively short corn crop, corn futures behind the scene were recording a record high in the futures in the May to July 1996 period and record high cash prices a bit later in the summer with cash corn prices in some deficit producing markets as high as $6.00 per bushel. Wheat prices obviously went with corn and benefited from the huge move up that the corn market saw and the largely bullish fundamentals that prevailed for wheat as well. In a year like 1996, what producers want from a moving average system is minimal or no losses and the opportunity to benefit from prices that were as high as $5.50, even in early to mid-July.

Both systems did reasonably well given that the futures had a $3.50 range within the year. Five round-turn trades via the 9/18 and an overall -17.00 cents after commissions would have left the producer with a net price near $5.00 in early July. Two relatively large losing trades occurred January through March of the year. There is always a tendency in an upward moving market for moving averages to sometimes see a small downward correction in prices as a "top" and signal short hedges. Calling a premature top happened with the 9/18 system and it was not able to recover all those losses on the much more favorable round-turn trade from May 24 to June 19. The 10/61 was more effective, generating only one round-turn trade with a sell signal on June 7 at 576.00 and then a closeout price of 535.25 on July 10. The 10/61 system generated a gain of 28.75 cents after commissions to add to the $5.00 plus futures price equivalent at harvest during 1996. For producers with substantial yields, it was a bonanza year.
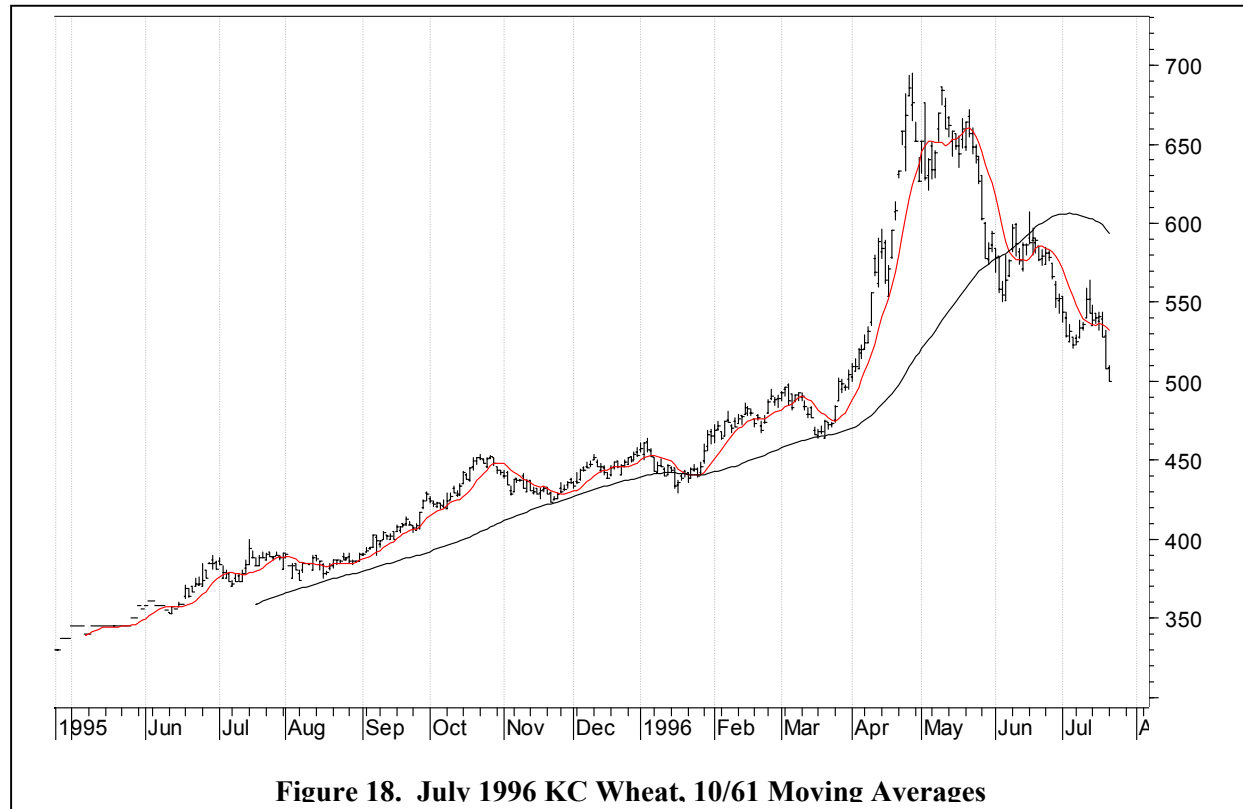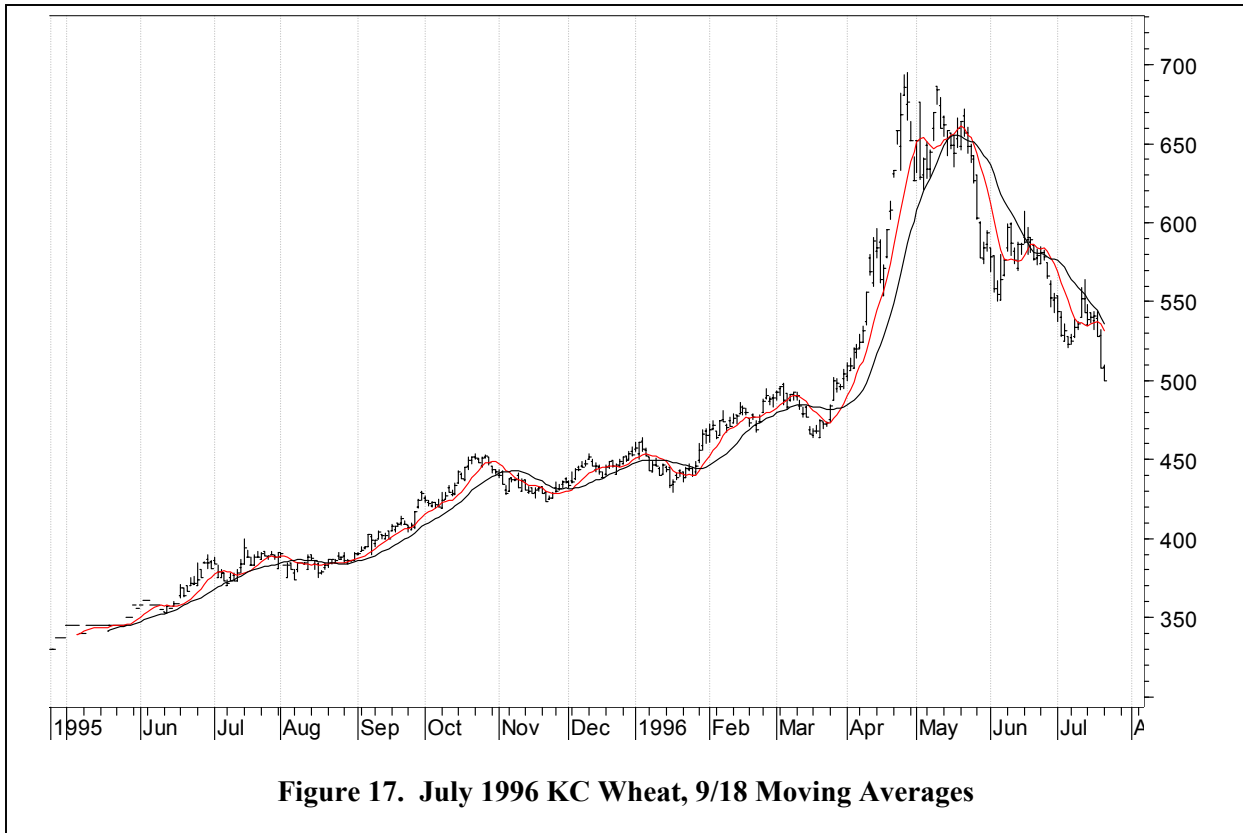
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Figure 17. July 1996 KC Wheat, 9/18 Moving Averages

Figure 18. July 1996 KC Wheat, 10/61 Moving Averages

Table 11. Transaction Dates, Prices, and Net for Each Round Turn Trade in a Short-Only Selective Hedging Program for Kansas City July Wheat, 1997			
Date	Action	Closing Price (¢/bu)	Net Trade (¢/bu)
9/18 System with No Penetration Rule			
11/01/96	Short	355.75	
12/18/96	Buy (B)	361.75	-6.00
01/06/97	Sell (S)	352.00	
01/13/97	B	367.00	-15.00
05/05/97	S	431.50	
07/11/97	Closeout	330.75	100.75
Overall gain: 79.75 ¢			
Gain less commissions: 76.75 ¢			
10/61 and 2-Cent Penetration System			
11/01/96	Short	355.75	
01/14/97	B	364.50	-8.75
05/28/97	S	395.25	
07/10/97	Closeout	330.75	64.50
Overall gain: 55.75 ¢			
Gain less commissions: 53.75 ¢			

1997 Review

The 1997 year was the reverse of what was seen in 1996. Prices trended sharply lower during the year from the $5.00 level down toward $3.40-3.50, then rallied based on weather problems back up toward the $5.00 level in April. Once again, the primary need for a selective hedging program during a year like 1997 is to get benefits from most of the surge in price that occurred from the November-December time period out through April and still have protection for much of the major and sustained price break that occurred from April into the June-July harvest period. The 9/18 generated three round-turn transactions during this period with a huge $1.00 per bushel plus gain on the last trade on May 5 to the closeout date on July 11 since July 10 was not a business day (Figure 19). The after-commission gain was 76.75 cents. That gain, added to a 340-350 futures price equivalent during the early-July harvest period, would push effective wheat prices back up toward $4.15-4.25 as a futures price equivalent.

The 10/61 performed well, generating one small loss from the short position established for the system on November 1 out toward a buy signal on January 14. Note that the system was then considerably later generating a sell signal than was the 9/18 (Figure 20). During May, the 9/18 generated a signal at 431.50 on May 5, and the 10/61 did not get a confirmed sell signal until May 28 at 395.25. Clearly, the big difference in the performance between the two systems during the year was the 9/18 gaining over $1.00 during that major downturn and the 10/61 generating a before-commission gain of $0.645 per bushel. Nonetheless, the 53.75 cent after-commission gain for the 10/61 during the year would push effective harvest-period futures price equivalents back up toward $4.00. Again, it was a very good year for producers with decent yields.
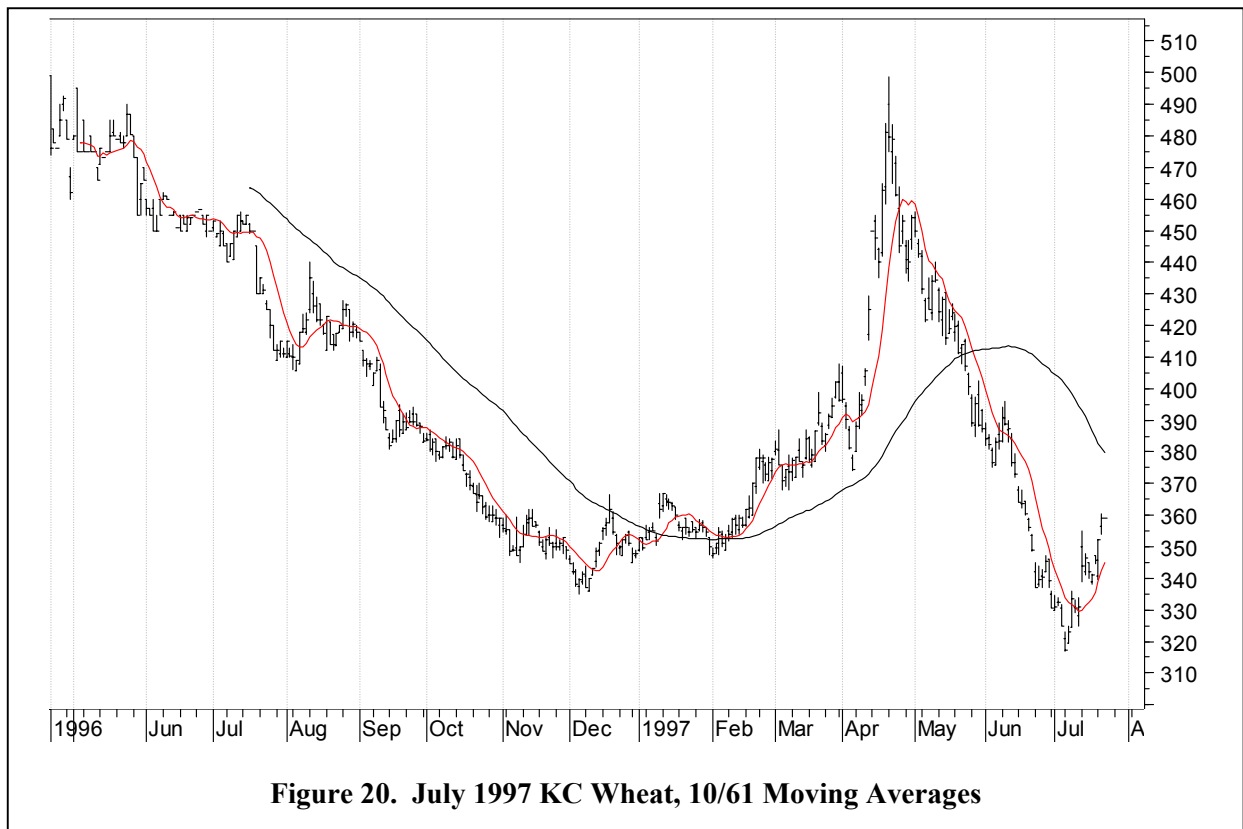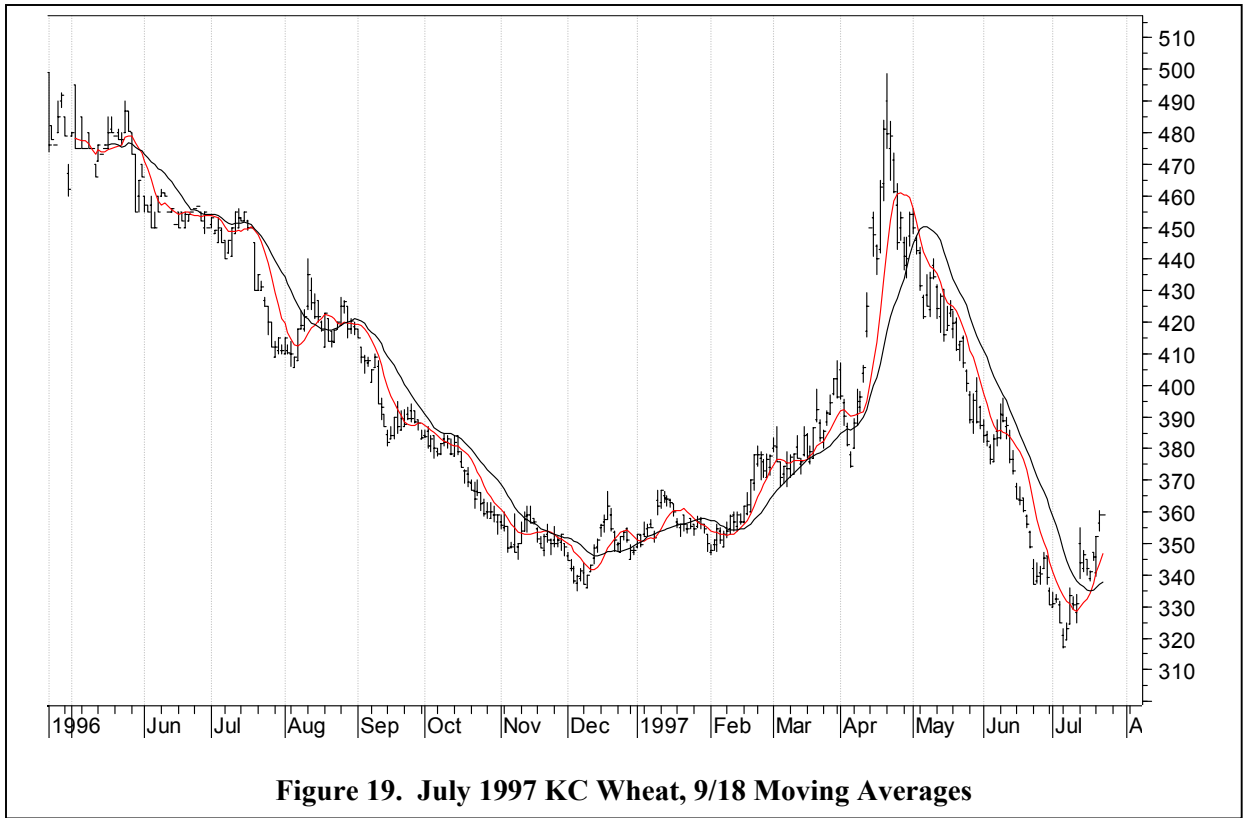
Figure 19. July 1997 KC Wheat, 9/18 Moving Averages

Figure 20. July 1997 KC Wheat, 10/61 Moving Averages

Date	Action	Closing Price (¢/bu)	Net Trade (¢/bu)
Table 12. Transaction Dates, Prices, and Net for Each Round Turn Trade in a Short-Only Selective Hedging Program for Kansas City July Wheat, 1998			
9/18 System with No Penetration Rule			
11/03/97	Short	397.00	
12/09/97	Buy (B)	380.25	16.75
12/12/97	Sell (S)	368.50	
01/21/98	B	358.50	10.00
02/13/98	S	359.50	
03/06/98	B	358.00	1.50
03/23/98	S	354.50	
05/12/98	B	322.50	32.00
05/19/98	S	322.25	
06/24/98	B	317.75	4.50
07/07/98	S	301.25	
07/10/98	Closeout	289.50	11.75
Overall gain: 77.50 ¢			
Gain less commissions: 70.50 ¢			
10/61 and 2-Cent Penetration System			
11/10/97	S	385.25	
03/12/98	B	366.75	18.50
03/25/98	S	349.75	
07/10/98	Closeout	289.50	60.25
Overall gain: 78.75 ¢			
Gain less commissions: 76.75 ¢			

1998 Review

After the November 1 starting period, the market basically trended lower. A producer would want to be protected against all or a substantial part of that price decline, which was from the $4.00 level in the fourth quarter of 1997 to below $3.00 in late harvest of 1998. The 9/18 generated a number of round-turn signals during the year (Figure 21). After commissions, gains for the 9/18 were 70.5 cents, pushing the $2.90-3.00 harvest-period futures equivalent well up into profitable territory at $3.60-3.70. The 9/18 was able to manage the ins and outs of this market. Upon examining the chart, the price surges or price dips do not look quite as dramatic as seen in earlier years; the timing of the moving average sell and buy signals was more effective.

The 10/61 was even more effective, generating a sell signal on November 10 and not buying short hedges back until March 12. A gain of 18.5 cents was generated, with a late March sell signal then occurring. With the July 10 closeout of 289.50 a gain of 60.25 cents was realized on that particular round-turn trade. The net after commissions for the 10/61 for 1998 was 76.75 cents, pushing the $2.90-3.00 futures price equivalent at harvest again well up into the $3.67-3.77 range, in profitable territory for most producers.
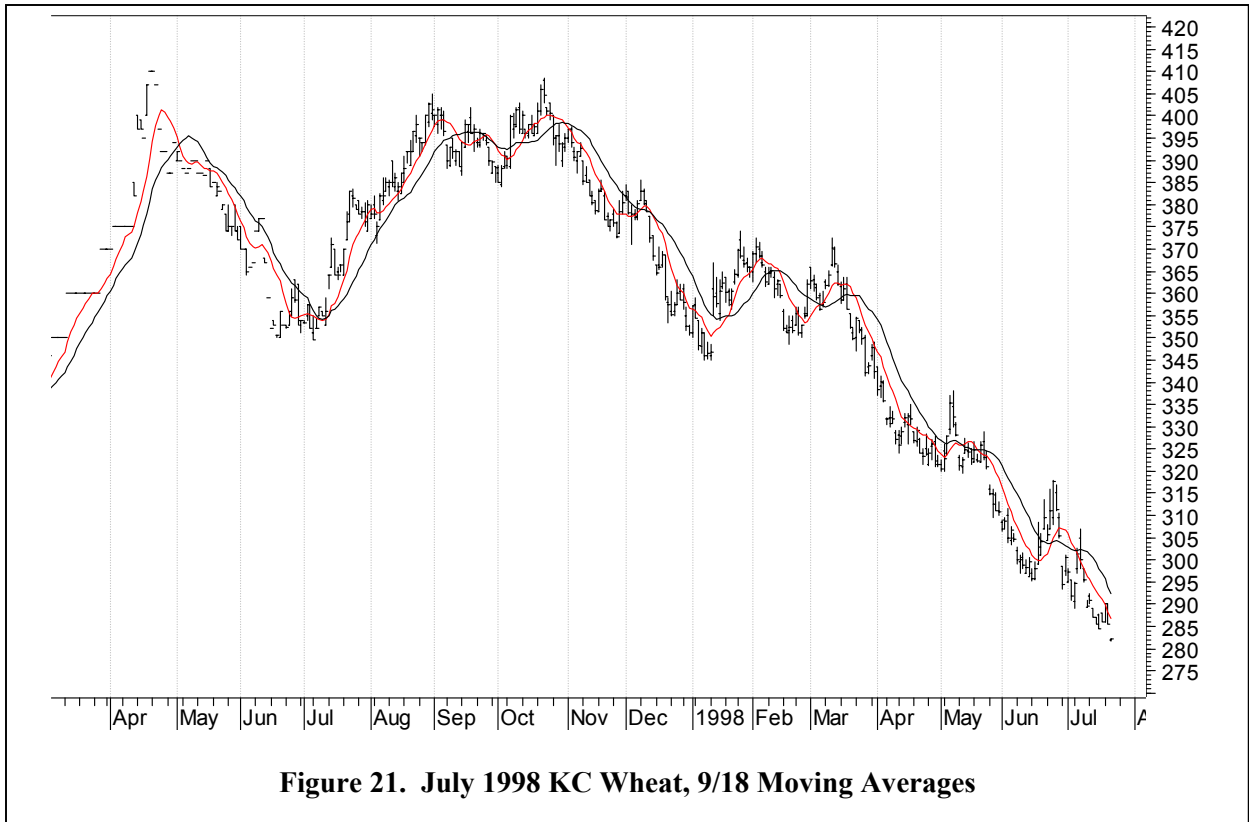
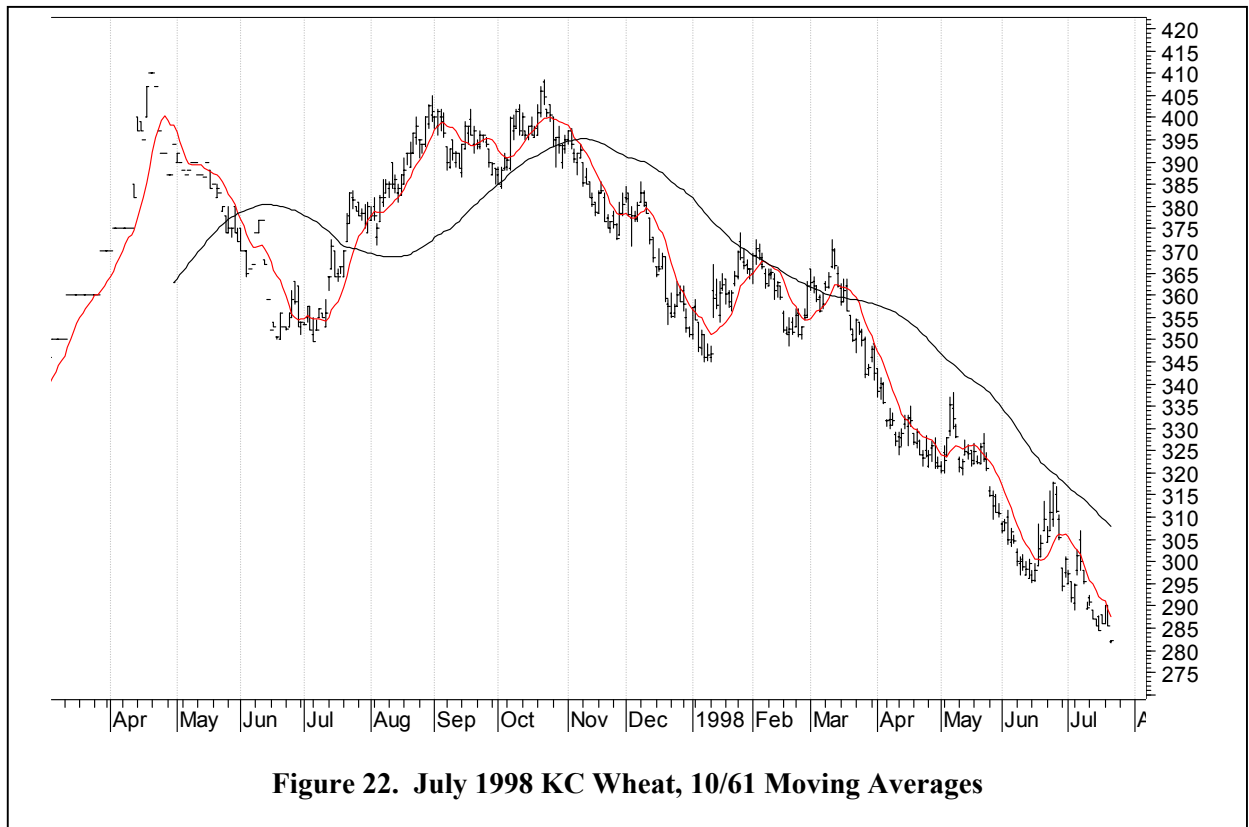**Figure 21. July 1998 KC Wheat, 9/18 Moving Averages**

Figure 22. July 1998 KC Wheat, 10/61 Moving Averages

Table 13. Transaction Dates, Prices, and Net for Each Round Turn Trade in a Short-Only Selective Hedging Program for Kansas City July Wheat, 1999			
Date	**Action**	**Closing Price (¢/bu)**	**Net Trade (¢/bu)**
9/18 System with No Penetration Rule			
11/06/98	Sell (S)	344.75	
11/19/98	Buy (B)	350.00	-5.25
11/23/98	S	337.00	
12/31/98	B	330.50	7.50
01/21/99	S	325.50	
03/11/99	B	316.00	9.50
04/12/99	S	295.50	
05/18/99	B	285.50	10.00
05/24/99	S	272.50	
06/07/99	B	287.25	-14.75
06/23/99	S	280.25	
07/12/99	Closeout	257.25	23.00
Overall gain: 30.00 ¢			
Gain less commissions: 24.00 ¢			
10/61 and 2-Cent Penetration System			
12/07/98	S	335.75	
07/12/99	Closeout	257.25	78.50
Overall gain: 78.50 ¢			
Gain less commissions: 77.50 ¢			

1999 Review

The 1999 year looks somewhat like 1998 in that the post-November 1 price moves were largely trending lower. Price surges and price dips this year looked a bit more abrupt and dramatic than they did in 1998, and the difference showed up in the performance of the 9/18 system (Figure 23). Six overall round-turn trades were generated with an after-commission gain of 24.00 cents. Two losses on this system occurred as it attempted to deal with a volatile market, one of them coming on the short hedges established on November 6 and the other later in 1999 on the short hedges established May 24. What happened after May 24 was a sharp surge up in price. Then, as soon as the buy signal was generated and the short hedge was lifted at a loss, the market turned lower again. With a harvest-period futures price in the $2.60-2.70 area, the 9/18 would have only improved the futures price equivalent to the $2.84-2.94 area.

The 10/16 was more effective, ignoring most of the short-term gyrations in the market and generating a confirmed sell signal on December 7. Those short hedges were not bought back during the entire time period, and the market was closed out (Figure 24) on July 12, the first business day after the closeout date of July 10. After-commission gains were 77.5 cents, converting a $2.60-2.70 market to $3.37-3.47 and making 1998 look substantially more attractive to producers.

Figure 23. July 1999 KC Wheat, 9/18 Moving Averages

Figure 24. July 1999 KC Wheat, 10/61 Moving Averages

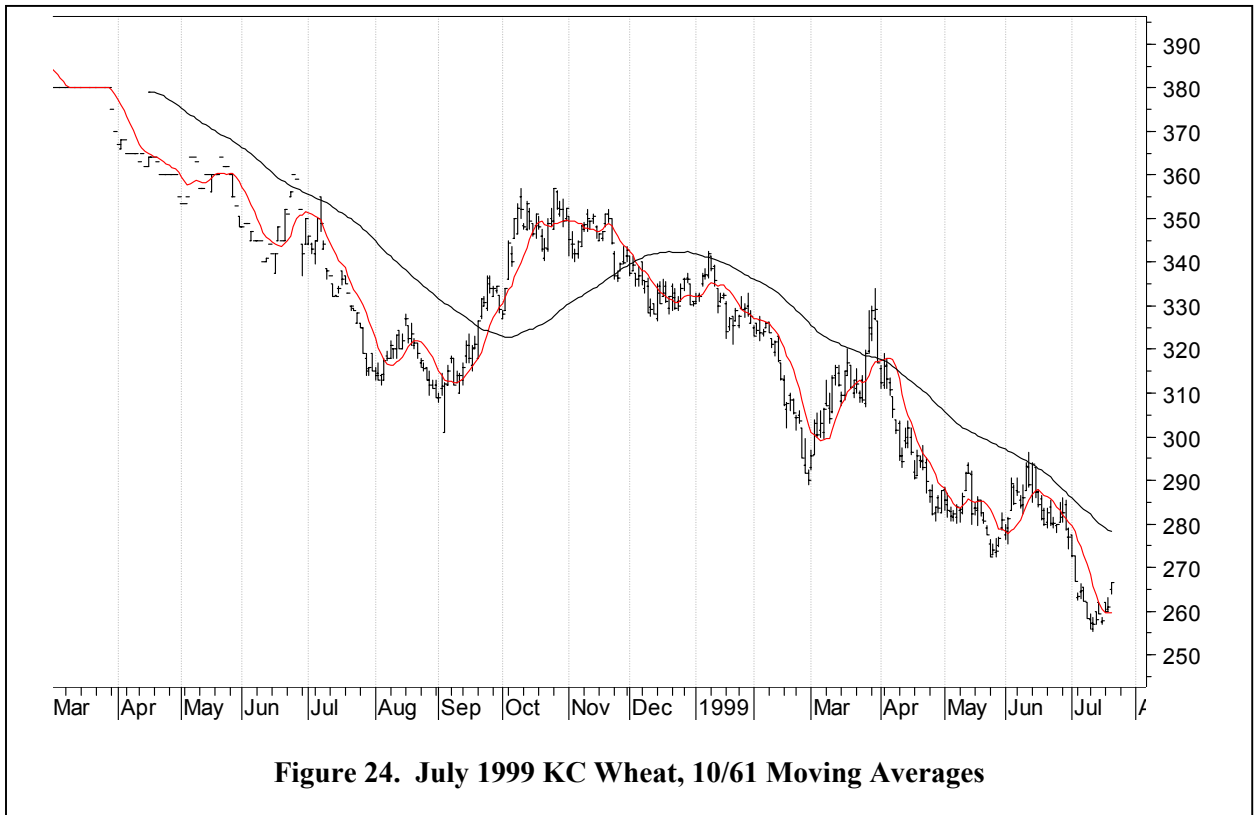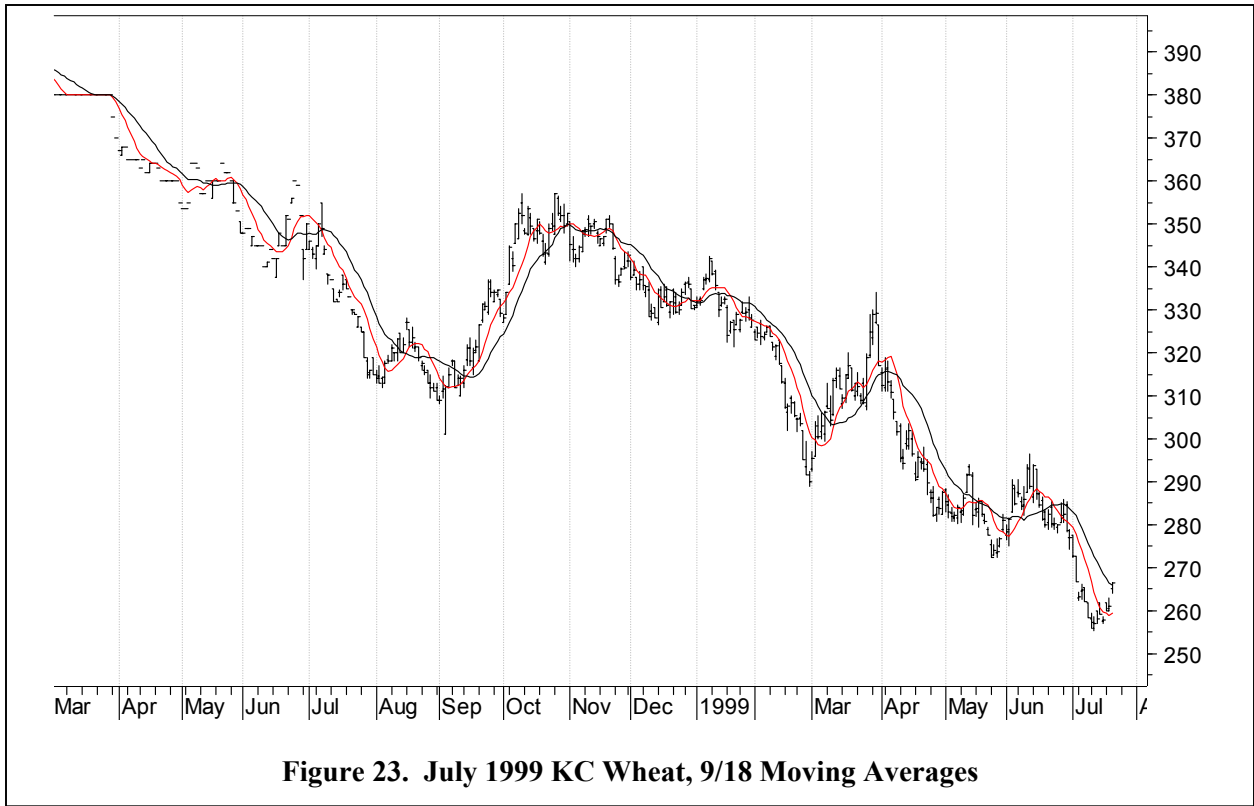|		Closing Price	Net Trade
Date	Action	(¢/bu)	(¢/bu)

Table 14. Transaction Dates, Prices, and Net for Each Round Turn Trade in a Short-Only Selective Hedging Program for Kansas City July Wheat, 2000

Date	Action	Closing Price (¢/bu)	Net Trade (¢/bu)
9/18 System with No Penetration Rule			
11/05/99	Short	314.50	
11/12/99	Buy (B)	306.00	8.50
11/16/99	Sell (S)	310.50	
12/28/99	B	294.75	15.75
02/03/00	S	303.25	
02/14/00	B	320.50	-17.25
02/28/00	S	296.75	
03/16/00	B	306.00	-9.25
03/27/00	S	289.50	
04/07/00	B	289.00	0.50
04/18/00	S	289.00	
05/09/00	B	291.25	-2.25
06/06/00	S	297.75	
06/21/00	B	310.50	-12.75
07/07/00	S	287.00	
07/10/98	Closeout	288.50	1.50
Overall gain:		-18.00 ¢	
Gain less commissions:		-25.00 ¢	
10/61 and 2-Cent Penetration System			
11/01/99	Short	308.00	
01/19/00	B	314.00	-6.00
03/07/00	S	298.50	
05/16/00	B	302.50	-4.00
Overall gain:		-10.00 ¢	
Gain less commissions:		-12.00 ¢	

2000 Review

The 2000 market showed a pattern of short-term moves up and down with no sustained and consistent move in price in any direction. Looking at the charts (Figures 25 and 26), especially during the period after November 1, indicates that this market is probably going to be difficult for any selective hedging system. The 9/18 generated a number of sell signals and subsequent buy-backs during the year with several of them realizing losses and the overall after-commission net of -25.00 cents. With July futures in early July in the $2.80-2.90 range, that would pull this market equivalent down to $2.55-2.65. The year 2000 clearly turned out to be difficult for these selective hedging systems, certainly for the 9/18.

The 10/61 did not fare much better. A short position was established in accordance with the 10 being more than 2 cents below the 61 on November 1, 1999. Those short hedges were bought back at a 6-cent loss on January 19. The subsequent sell signal in early March was bought back in mid-May at another small loss. Overall, there was a -12.00 cents loss, less than the 9/18 loss but not impressive. Obviously, 2000 is a year in which moving average systems did not work well. They will typically not work well in a market with choppy moves up and down and no sustained moves to lower prices or to higher prices.

Figure 25. July 2000 KC Wheat, 9/18 Moving Averages

Figure 26. July 2000 KC Wheat, 10/61 Moving Averages
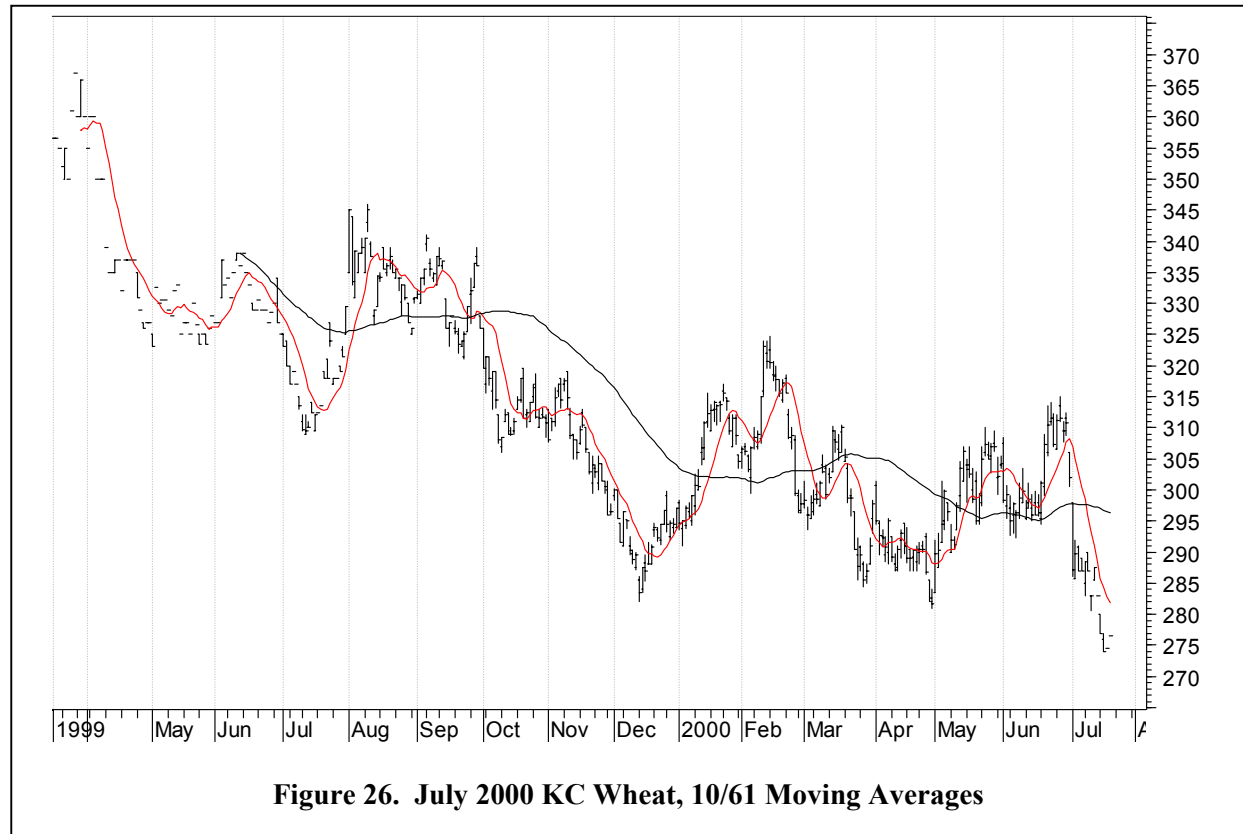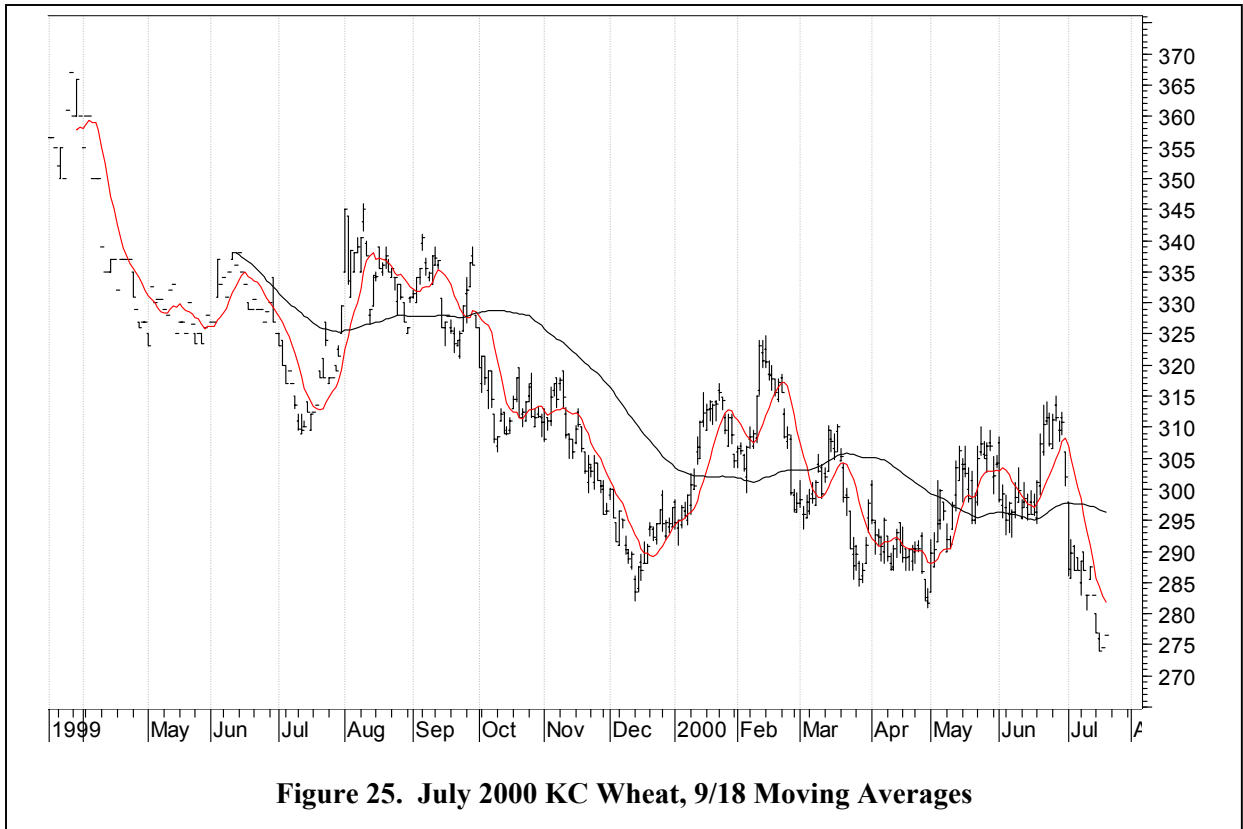
Summary on Performance

Table 15 shows the overall results. On average, the 10/61 added nearly $0.29 per bushel to wheat prices and the 9/18 added nearly $0.17 per bushel. The $0.29 is 9.4 percent of the average cash price of $3.10 using a -$0.25 harvest-period basis. The 10/61 system lost money in 1993, 1994, and 2000, with the 2000 performance clearly the worst.

In recognizing that such a "short hedge only" system will, on occasion, lose money for the year, it is important to remember that (1) short hedges will be in place during sustained price decreases and this protection has a value, and (2) the systems keep the producer off short hedges during sustained price rallies to allow the benefit of higher cash prices. In the 10/61, we have a flexible system that offers protection, allows benefits of rising markets, and averages $0.29 per bushel in after-commission profits.

Table 15. After Commission Net Profits by Year, for July Kansas City Wheat, and Overall Average Net Profits for the 9/18 and 10/61 Systems						
	Net After Commissions				Effective Price With	
Year	9/18	10/61	July 10 KC July Wheat	Cash Price with -$.25 Basis	9/18	10/61
	(¢ per bushel)				($ per bushel)	
1990	36.50	19.50	303.75	2.79	3.16	2.99
1991	-4.25	29.50	266.00	2.41	2.37	2.71
1992	33.75	27.25	332.00	3.07	3.41	3.34
1993	4.25	-16.50	(7/12) 300.00	2.75	2.79	2.59
1994	-25.50	-1.50	(7/12) 330.25	3.05	2.80	3.04
1995	-5.00	4.75	446.00	4.21	4.16	4.25
1996	-17.00	28.75	536.25	5.11	4.94	5.40
1997	76.75	53.75	330.75	3.06	3.83	3.60
1998	70.50	76.75	289.50	2.65	3.36	3.42
1999	24.00	77.50	257.25	2.32	2.56	3.10
2000	-25.00	-12.00	288.50	2.64	2.39	2.52
Average	16.90	28.78	334.57	3.10	3.25	3.36

Figure 27 shows yearly effective prices for the 9/18 and 10/61 with a cash price series that reflects a -$0.25 basis. Figure 27 is a graphical picture of the 3 columns on the right side of Table 15.

Figure 28 shows important cash flow information. It is possible that a risk management program generate profits for the decade, but the farm firm might still go broke with negative cash flows during the period. The cumulative after commission additions to profits for the 9/18 and 10/61 are always above the zero line. The cumulative additions to profits are nearly $3.00 per bushel for the 10/61 system in the last two years, and this positive contribution to the cash flow would have reduced the need to borrow money to produce the wheat crops and significantly increase the profitability of hard red winter wheat producers who followed the 10/61 system in a selective hedging program.
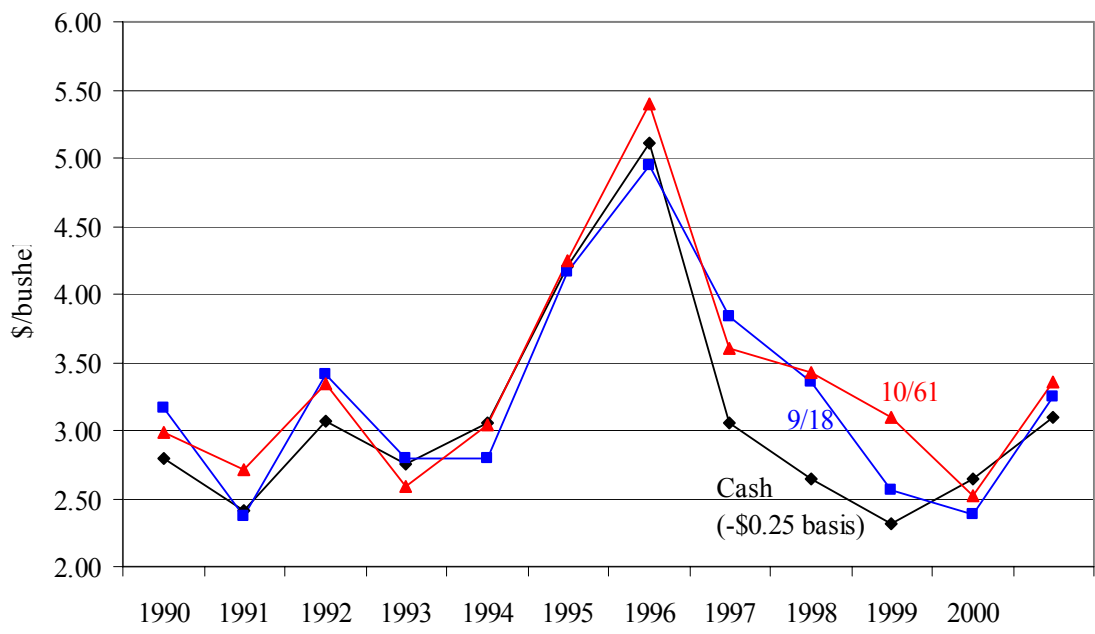
Figure 27. July 10 Cash Price and Effective Prices for 9/18 and 10/61 Moving Average Systems, 1990-2000
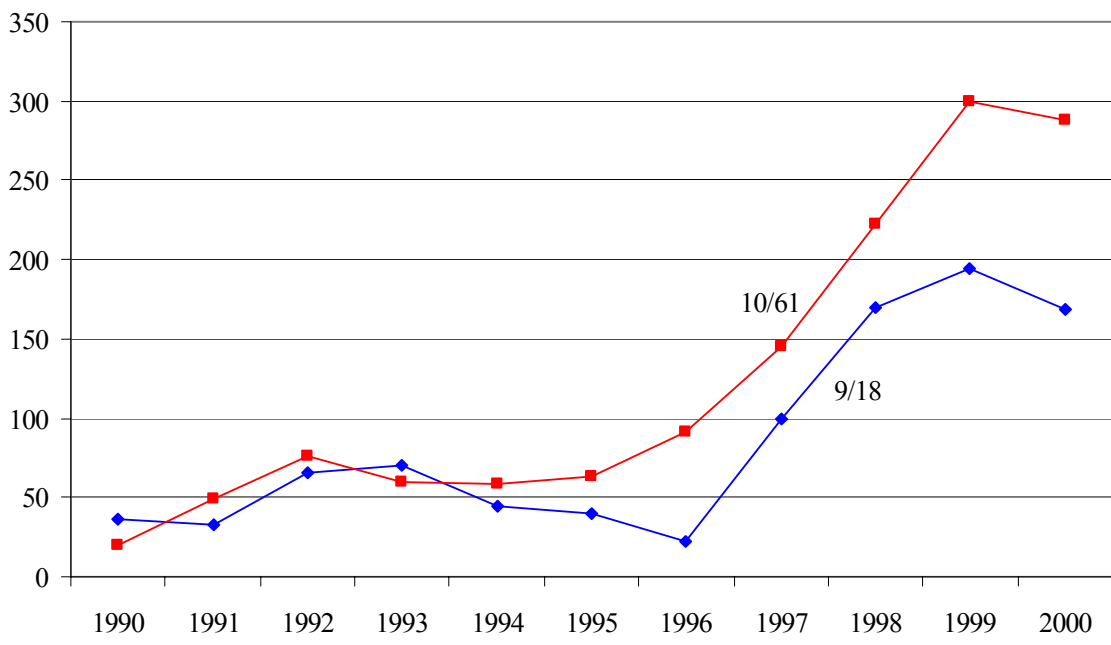

Figure 28. Cumulative Revenue Above Cash Price for 9/18 and 10/61 Systems, 1990-2000

Review of Performance in Years with Strong Positive Price Trends

Consistent with the stated objective of moving average systems, the selective hedger will want to benefit from higher prices during years in which the price trend is up. One of the sub objectives of being a selective hedger is to avoid the opportunity costs and the margin calls associated with holding short hedges or cash forward contracts during upward trending markets. The preference would be for a moving average system that, if it cannot show positive results during the year, would show a result close to zero and, therefore, leave most of the benefit of higher prices to the producer. During the 1990s, there were two years in which the price trend was generally higher during much of the year. The first year was 1995, when July Kansas City prices, which were in the neighborhood of $3.50 in November and December, exploded to the upside and reached the $5.00 level in July. Examination of Table 9 indicates that both of the moving average systems were quite effective in this particular year. The round turns recorded by the 9/18 combination showed a minimal loss of 5.0 cents per bushel after commissions, and the 10/61 system was even better. It showed a nominal gain of 4.75 cents. Both systems clearly allowed the producer to benefit from cash prices well above $4.00 with a -$0.25 harvest-period basis level. The minimal loss of the 9/18 can be viewed as the opportunity cost of not being a cash market speculator during the year, but the selective hedger was in a far different position from the producer acting as a cash speculator. There was protection in place when the markets turned down periodically during the year for the selective hedger, but the cash market speculator was totally exposed if the year had turned out differently and prices had moved sharply lower. The ideal for a selective hedging program during such an up year in price is small losses at the worst, small or significant gains at the best. The 9/18 showed the small losses and the 10/61 was even better in showing small gains after commissions.

The second year, 1996, looks a bit different. Prices that were in the $4.30-4.50 range in November and December of 1995 spiraled up toward the $6.50-7.00 level in April and May, and then backed off to the $5.00-5.50 range in July. The cash price equivalent with a negative 25-cent basis on July 10 with the $5.36 closing price on that date $5.11. The 9/18 lost 17.0 cents after commissions and reduced the effective harvest-period net cash price to $4.94. The 10/61 was much better in this particular year, adding nearly 29 cents to the cash price equivalent of $5.11 and pushing the effective cash price up to $5.40 given the price levels of July 10. This exceptional performance occurred in a year in which the market showed a strong move up and then a fairly substantial decline during the last two months of the year. The 10/61, by avoiding any false signals in changes in direction of price movement, was very effective in 1996.

Review of Performance in Years with Consistently Lower Price Move

During years of falling prices, the objective of the selective hedger is to have protection against most of the price decline. As guides to selective hedging programs, performance of the moving average systems must be examined with a very critical eye during years of falling prices. For three years during the 1990-2000 period, the predominant move was downward from late in the prior calendar year into harvest. In 1990, the July futures were in the $3.40-3.60 range in October and November of 1989 and moved to below the $2.90 level in July of 1990. The selective hedger will want the moving average system to generate protection against much or all of the price decline that reached 80 to 90 cents in magnitude by the end of the year. The 9/18 system generated after-commission gains of 36.5 cents and was, in 1990, significantly better than the 10/61, which generated after-commission gains of 19.5 cents. The effective net prices were near $3.16 and $2.99 respectively for the 9/18 and 10/61 systems, with both prices being

significantly better than the $2.79 cash price consistent with the $3.04 closing price of the July wheat futures on July 10, 1990. Performance was positive but not exceptional in that something less than full coverage was afforded by the two systems.

The next year in which the price trend was predominantly lower all year was 1998. With futures as high as $4.00 and higher in the fourth quarter of 1997, this market moved lower and was well below $3.00 during the early July harvest period. From the highs during the year, this move down was in excess of $1.00 per bushel. Both systems performed well in that the 9/18 generated after-commission nets of 70.50 cents and the 10/61 was even better at 76.75 cents. This performance, of course, is what the selective hedger wants to see in that the majority of the price declines suffered during the year in the cash market was covered in the short hedging program in futures. In Table 12, the cash price equivalent of $2.65 on July 10 ($3.00 futures less $.25 basis) was effectively raised to $3.36 by the 9/18 system and to $3.42 by the 10/61 system. Performance was exceptional by both moving average systems during a year in which the prices moved down from quite profitable levels to break-even or loss levels at harvest.

The 1999 season showed significant price moves down to some of the lowest levels seen in a decade. The market was in the $3.50-3.60 price range in the fourth quarter of 1998 and slid below the $2.60 level in early July 1999. Once again, the need for the selective hedger is to have protection against the majority of what was roughly a 90-cent per bushel decline in price. In 1999, both systems contributed, but the contributions were significantly different. The 9/18 was caught up in some in-and-out trades and some small losing trades during the year as the market turned volatile. The system contributed an after-commission net of 24.00 cents a bushel. The 10/61 avoided the in-and-out trades and performed much better, adding 77.50 cents to the cash price equivalent at harvest of $2.32 ($2.57 July 10 close less $0.25 basis). The 10/16 system would, therefore, move the effective cash price up to about $3.10 and put it back at price levels that would be profitable for most producers. Contributing after commission gains of 77 cents in a year in which the price range after the 1998 harvest was only about $1.00 is indeed impressive performance, and I would not expect to see this reproduced each year in which prices trend lower.

The Most Difficult Year for the Selective Hedging Systems

In both up and down markets, the moving average systems can clearly perform well during years in which sustained moves in price occur. If the trend is higher during much of the year, and those higher prices come in a rather orderly and well behaved bull market without short-term gyrations, both systems are capable of ensuring that the producer gets the benefit of the rising cash market. Producers tend to stay off the short hedges and avoid both the opportunity costs that otherwise would be suffered as prices move higher in the presence of short hedge positions and, at the same time, they avoid the significant margin calls that otherwise would be present. Clearly, that when the market moves down in a sustained fashion, the moving average systems can cover the majority of losses that would be incurred if the producer were acting as a cash market speculator. Examination of the July contracts in 1990, 1998, and 1999 indicated that performance will be much better when the downward price movement comes in a sustained fashion as compared to a choppy, volatile price pattern.

The single year in which the performance was poorest for the selective hedging systems was clearly the 2000 Kansas City July wheat futures. Studying the charts in Figures 25 and 26, one can easily see why the poor performance might have been the case. From fourth quarter price levels in 1999 in the 305 to 315 area, the market chopped sideways in a volatile fashion all year, reaching a price level of around 325 in February, dipping to the 280-285 level in March and April, and then moving down toward 275 in the early July period. Also of note is that the market was in a 50-cent trading range from late 1999 through harvest, having none of the characteristics of sustained moves in any one direction that tended to occur in

most years of the 1990s. The 9/18 generated a number of round turn trades that imposed small losses on the producer, and the 10/61, while not trading frequently, was not much more effective. The after-commission net for the November 1 through July 10 analysis period from the 9/18 was -25.00 cents and the after-commission net from the 10/61 was -12.00 cents. These after commission results converts the relatively poor cash price of $2.63 ($2.88 less $0.25 basis) on July 10, 2000 to $2.38 and $2.51 for the 9/18 and 10/61 systems, respectively. Clearly, losses can be associated with moving average systems in choppy, sideways markets. Such losses in years with choppy price action are the insurance premiums, perhaps, that producers have to pay to be sure that they will have protection during years in which the price moves down in a sustained fashion and to also be in a position to benefit from rising cash markets in years in which the markets move up in a sustained fashion.

Testing Out of Sample

There is no guarantee that a system that is profitable in the 1990-2000 period will be effective outside the data period from which the optimal system is derived. A common practice to indicate whether the system is likely to work in other years is to conduct "out-of-sample" tests.

The 10/61 system of moving averages is shown on the July 2001 Kansas City wheat chart in Figure 29. Not all data used in calculating the 61-day moving average are shown on the chart, but the first confirmed short hedge (2-cent penetration requirement was met) occurred on December 15 at a closing price of 330.50. This and later round-turn trades are shown in Table 16.

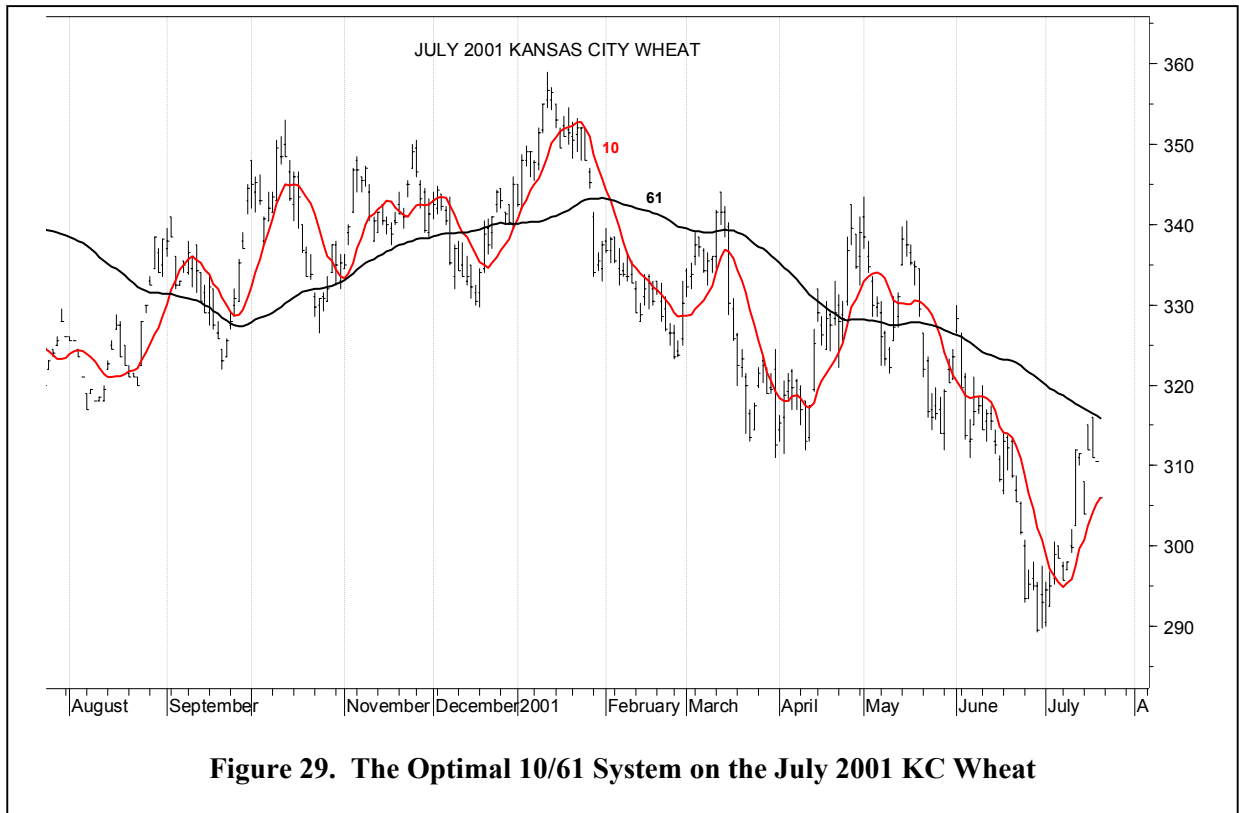| Table 16. Results of Out-of-Sample Test			
Date	**Action**	**Closing Price (¢/bu)**	**Net Trade (¢/bu)**
12/15/2000	Sell	330.50	
01/06/2001	Buy	349.00	-18.50
02/06/2001	S	333.75	
04/27/2001	B	334.25	-1.00
05/29/2001	S	319.25	
07/10/2001	Closeout	298.00	21.25
	Overall gain:	1.75 ¢	
	Gain less commission:	-1.25 ¢	

JULY 2001 KANSAS CITY WHEAT

Figure 29. The Optimal 10/61 System on the July 2001 KC Wheat

The net after commissions was -1.25 cents, indicating that 2001 was a year in which the 10/61 did not work very well. The market was choppy with no sustained moves down until the late May to July decline. The May 29 sell signal did protect against a prolonged price dip, but there was no added revenue to make the net cash price better than a cash market speculative position would have been in 2001.

The July 2002 contract is shown in Figure 30. The 10/61 was in a "sell mode" from the earliest possible calculation of the 61-day moving averages. Following the rules used in analysis of the 1990-2000 period, short hedges were established on November 1 at the closing price of 314.25. Those positions would have been lifted by a confirmed buy signal on June 7 at 298.00. (Neither the late-January nor the mid-April price surge pushed the 10-day moving average as much as 2 cents above the 61-day moving average.) The after-commission gain would be 15.25 cents. With a July 10 closing price of 348.00 and using the -$0.25 per bushel basis, the cash price equivalent on July 10 would be $3.23 and the $0.15 gain from the moving averages would boost the effective cash price to $3.38.

The life-of-contract high on this chart was $3.84 on January 25 of 2001 when little or no trade activity occurred. The effective price of $3.38 is only $0.21 below the best forward pricing opportunity ever offered ($3.84 top price minus $0.25 basis) during the life of the contract. Technically, producers could have used the 10/61 to establish short hedges earlier than November 1 and at higher prices (see Figure 30), but the November 1 rule was used in the interests of consistency. The July futures prices up toward $3.50 and the 15.25 after commission gains from the moving average system combine to make this a very effective year for the selective hedger.

JULY 2002 KANSAS CITY WHEAT

Figure 30. The Optimal 10/61 System on the July 2002 KC Wheat
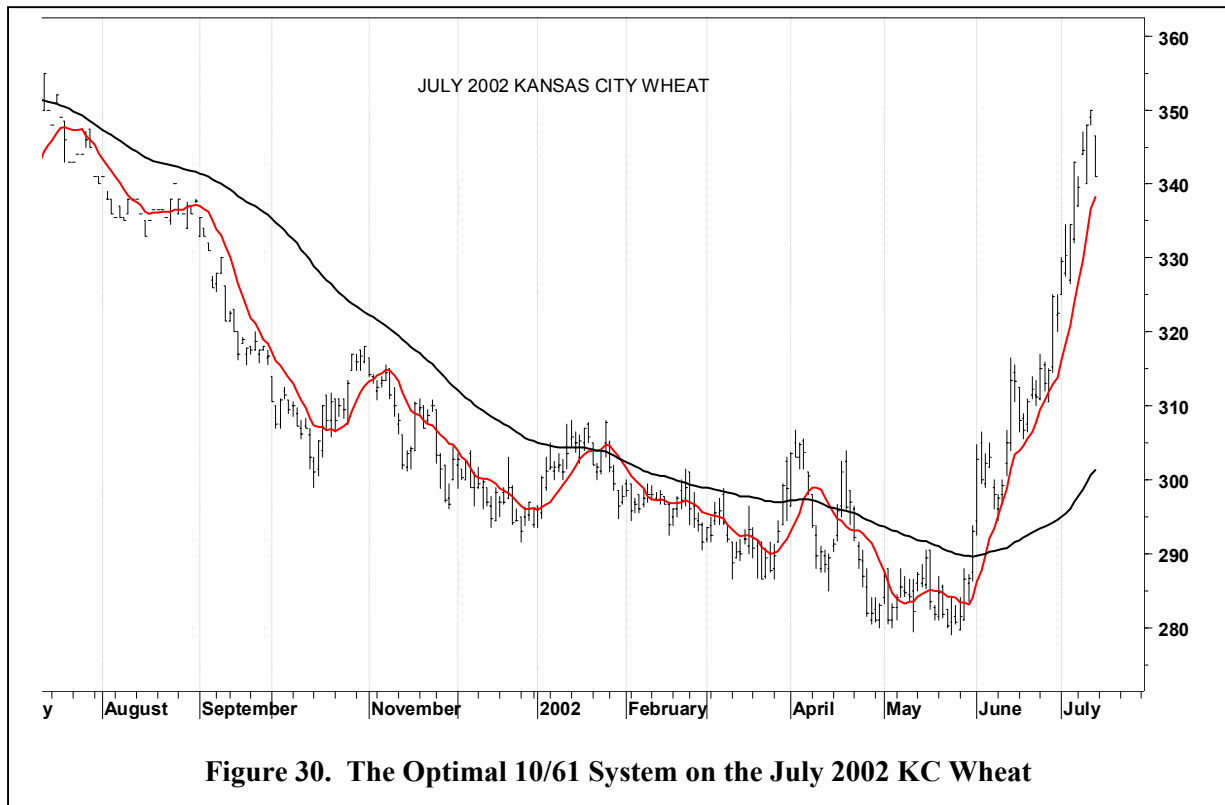
The 10/61 system was actually effective for the 2002 crop in two important ways. First, using the 10/61, producers would have been short almost all year with short hedge protection in place and with no trading on and off the short hedges. The system then required producers to lift the short hedges in early June to allow the second benefit, bring in position to take advantage of the 70-cent rally from the $2.80 lows of early June up to the $3.50 area in early July . The flexibility of moving average systems in guiding a selective hedging program is evident on this 2002 contract.

No details are provided, but the 10/61 system with the 2-cent penetration requirement was also tested across the 1980-89 period. During those 10 years, the profit maximizing system was the 12-day and 13-day moving averages with a 0.5 cent penetration requirement. Average yearly profits were 18.48 cents. The system traded 41 times across the 10 years, or about 4 times per year on average.

The 10/61 with the 2-cent penetration requirement averaged 11.55 cents yearly with 15 trades across the 1980-89 period. In terms of percentiles, the 10/61 was at the 86th percentile for the 1980s, which means only 14 percent of all possible moving average and penetration requirement combinations analyzed were better. This effective performance outside the 1990-2000 data period suggests the 10/61 system is in fact effective outside the period in which it was generated, but performance in any future year is never guaranteed. If and when the hard red winter wheat market changes significantly in terms of frequency and/or amplitude of price moves relative to the 1990s, some system other than the 10/61 with the 2-cent penetration requirement might then be consistently better.

Overall Comments

The objective of the selective hedger is to have protection against major price declines and be off short hedges so as to benefit when prices move up. A proficient and disciplined chart reader may be able to meet these objectives, but not everyone is "proficient" any many potential hedgers are not "disciplined." The moving average systems provide an objective alternative.

Across the 1990-2000 period, the optimal 10-day and 61-day moving average system with a 2-cent penetration rule averaged nearly $.29 per bushel per year in after-commission profits. Price risk exposure could have been managed by the user of the system in such a way that ruinous losses were avoided and producers would been in position to benefit from sustained price increases. As a guide to risk management and as a safety net to protect the financial position of the farm firm, the optimal system has something to offer that will be in addition to any price supports and/or subsidies offered by the latest Farm Bill. Hard red winter wheat producers are encouraged to take a look.

Kansas City July wheat futures are now traded longer than they were in the early 1990s. As a last suggestion, I would start monitoring the 10/61 system with the 2-cent penetration rule around July 1 of the prior year with the intent of placing short hedges the first time a sell signal is generated after July 1. Usually, there is some type of post-harvest price rally that will then, sometime later, show prices starting to decline and generate a sell signal. The "rule" of taking the November 1 close to start the short hedge positions in this analysis was necessary because the early 1990s contracts did not start trading early enough to calculate a 61-day moving average prior to November 1. There should be no such restrictions in the future.