CHAPTER 11

PRICE RISK MANAGEMENT STRATEGIES

INTRODUCTION

No single management strategy will prove superior for all decision makers. Which strategy is best will depend on many dimensions of the situation. Among the more important of those dimensions are the attitude of the decision maker toward risk, the financial position of the operation that influences the capacity to carry exposure to risk, and the abilities of the decision maker as a manager of the various risk management tools.

Before developing strategies, it is productive to step back and address just what is being discussed. The need is for effective management of price risk, but just what does that mean? How important is the price risk issue? Is it potentially devastating? Enough to run you as an agricultural producer out of business?

Table 11.1 provides a baseline for purposes of discussion. Corn is the key feedgrain in the U.S. and is a major export commodity. Hogs are an important livestock commodity and are widely produced throughout the United States. The table provides price ranges for nearby futures for the calendar years 1980 through October of 1997 and shows the general direction of price movement within the year ("D" for down, "U" for up).

Not surprisingly, there are about as many "up" years as "down" years. Does that mean just being a cash market speculator will work? The answer is no, not unless there are big financial reserves.

To cover all costs of production, corn prices of at least $2.00 are needed for most producers. Keep in mind that the prices in the table are *futures prices.* When the futures data in 1986 moved down to the $1.60 level, cash prices in some producing area dropped toward $1.00. There were reports of cash corn selling for $.96 per bushel in Des Moines, Iowa, in the fall of 1986.

Heavy subsidies from government farm programs have kept corn producers in business. In periods like that of 1986–87, 70–80 percent of the net farm income in some midwestern states came from the government programs. Without the subsidies, such low prices would have been financially ruinous to many producers. And there is another side to the story. The price rallies in 1980, 1983, and 1988 were all caused by droughts.

TABLE 11.1
Approximate Price Ranges for Corn and Hog Futures (Nearby Contracts) 1980–1997 with Indication of Direction of Price Movement within the Year ("U" = up, "D" = down)

Calendar Year	Price Range	
	Hogs (Direction) ($ per cwt.)	Corn (Direction) ($ per bu.)
1980	$28–53 (U)	$2.60–4.00 (U)
1981	53–38 (D)	4.00–2.60 (D)
1982	40–68 (U)	2.80–2.20 (D)
1983	60–40 (D)	2.40–3.20 (U)
1984	40–58 (U)	3.60–2.70 (D)
1985	55–35 (D)	2.80–2.20 (D)
1986	38–64 (U)	2.60–1.60 (D)
1987	64–40 (D)	1.50–2.00 (U)
1988	45–40 (D)	2.00–3.60 (U)
1989	40–52 (U)	2.90–2.20 (D)
1990	47–67 (U)	2.40–2.90 (U)
1991	64–46 (D)	2.23–2.66 (U)
1992	38–52 (U)	2.74–2.18 (D)
1993	57–40 (D)	2.10–3.06 (U)
1994	30–53 (D)	3.12–2.10 (D)
1995	36–57 (U)	2.27–3.75 (U)
1996	44–67 (U)	5.54–2.56 (D)
1997	64–44 (D)	3.20–2.38 (D)

Many producers had little or no crop to sell at those high prices. Now, the 1996 farm bill legislation has removed the "safety net" for corn producers. Target prices and deficiency payments are gone, and producers are left to cope with what is likely to be an even more volatile market.

For hogs, a price of around $45.00 per hundredweight is needed to cover all costs for the typical producer. Some large operations have lower costs, but the data in Table 11.1 indicate frequent periods of major difficulty. The 1984 period was especially difficult for hog producers. Buffeted by higher corn prices and cash hog prices that dipped toward $30.00 in late 1984 and early 1985, many producers did not survive. In 1994, prices dipped briefly below $30.00 before the record high corn prices of 1995–96 reduced production and pushed prices higher. *The markets are very risky and the probability of a financially ruinous price move is not small. The capacity to manage that risk is very important.* The situation is not appreciably different for wheat, cattle, cotton, interest rates, exchange rates, and the other sources of risk that have surfaced or have increased in the 1970–1997 period.

In this chapter, price risk management strategies are discussed. Coverage cannot be exhaustive, of course, but an effort is made to provide an array of alternatives from which you as a potential decision maker can choose. Both the fundamental and technical approaches to analysis of the markets are employed and demonstrated.

ATTITUDE TOWARD RISK

A broad set of literature covers the importance of the decision maker's attitude toward risk. Here, the discussion will focus on a risk-averse decision maker and on a decision maker who seeks relatively high exposure to price risk when additional profit poten-

tial appears to be present. Most decision makers will fall on the continuum between the two, but this approach allows emphasis on how the correct strategy will vary with the attitude toward risk.

In most instances, an inverse relationship exists between the level of risk exposure and the potential returns. In an investment context, the more risky the venture, the greater the potential returns must be to attract investors. In the context of agricultural producers, the attitude toward risk often shows initially in the selection of enterprises. The risk-averse producer is more likely to be diversified as an attempt is made to spread production risk across several enterprises. This may prevent specialization in the crop or enterprise for which the production unit is best suited, but it may also reduce the possibility of a ruinous financial position in the event of extremely low prices on a particular crop or livestock enterprise when the producer is operating as a cash market speculator. The data in Table 11.1 suggest there is in fact reason to be concerned.

Typically, the same attitude will be transposed to the willingness to be exposed to price risk. *The risk-averse decision maker may be willing to suffer the opportunity costs associated with an unexpected price increase in the cash market in order to ensure there will be protection against falling prices.* A hedging or price risk management strategy will be adopted that fits that preference pattern.

Decision makers who are willing to accept exposure to price risk in the hopes of a higher return will opt for a different strategy. A producer may often choose to be a cash market speculator and look for the occasional strong move up in corn, wheat, cattle, hog, or cotton prices associated with unexpected developments in the supply-demand balance. These decision makers tend to prefer a selective approach to hedging. They want protection against potentially ruinous prices but are eager to be in a position to benefit from surges in cash prices.

The advent of options on the commodity futures in the early 1980s injected a new element into the situation. Risk-averse producers can buy put options to gain protection against declining prices and still be in a position to benefit from any unexpected surges in cash price. They may be willing to pay the option premium and tend to see the premium as the insurance premium for protection against lower prices. As noted in Chapter 7, options are often more flexible than the futures as price risk management tools.

Even with the options, the risk takers will often choose different approaches. They tend to be worried about paying the option premiums that they often argue are too high, and they get concerned about the fact that the cash market must rally enough to more than offset the premiums before they are in a position to benefit. This type of producer will tend to prefer some of the more sophisticated option strategies discussed in Chapter 7. They may be willing to carry exposure to risk for some range of lower prices in order to secure a net above the straight hedge for higher prices or for a preselected price range. In effect, the options are being converted or adapted to a strategy that has some of the characteristics of the selective hedge.

In very simple terms, the contrast can be shown as in Figure 11.1. The risk-averse producer and the risk-seeking producer have a different preference structure with regard to the level and variance of revenue. The variance is a statistical measure of variability, and the risk seeker is willing to accept exposure to more variability if the potential of higher revenue is present. Note, however, that the curve is increasing at an increasing rate, indicating that even the risk seeker will need to be compensated heavily as the measure of variability and therefore risk exposure grows.

The risk-averse producer operates with a different perspective. Such a producer will give up revenue to keep the risk exposure at tolerable levels. Note that the function

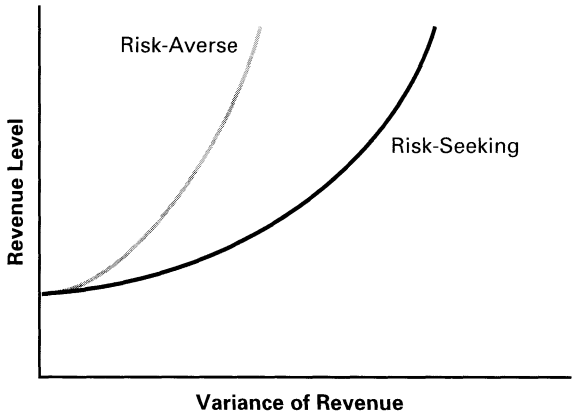

FIGURE 11.1
Simplistic Preference Functions for Risk-Averse and Risk-Seeking Decision Makers

is close to the vertical axis and also that it increases at an increasing rate, indicating that the rate of substitution between level and variability of revenue changes as the variability and related risk exposure grows.

Decision makers' preference functions can be developed into an analytical framework using the mean and variance of revenue or income streams. The book by Sharpe and Alexander listed in the references at the end of the chapter provides added coverage. *Here, the need is to recognize that different producers will make decisions that reflect differences in the underlying willingness to substitute level of income for variability of income.*

The attitude of the decision maker toward risk will be an important determinant of the strategies that will be employed. Risk-averse decision makers will opt for more conservative strategies and will be more nearly willing to pay the option premiums or to answer margin calls. Decision makers who are willing to accept risk for the chance of a higher return will opt for selective hedging approaches and the more sophisticated options strategies.

FINANCIAL POSITION OF THE FIRM

The financial position of the farm will influence the capacity to carry exposure to price risk. For the highly leveraged operation that is carrying a heavy debt load, a major and unexpected drop in price might put the firm out of business. So, in addition to being more likely to be diversified on the production side, the decision maker with limited finances will tend to opt for strategies that essentially guarantee protection against price declines. It is not unusual to find that the lending agency will require protection against price risk for the operations that are highly leveraged in financing the operation. These self-imposed and external requirements will often mean the producer is looking to guarantee at least a break-even price before the crop is planted or to cover the variable costs on at least a portion of the crop. In the livestock sector, producers may be required to forward-price cattle or hogs before they are even allowed by the lending agency to borrow funds to buy the feeder cattle or feeder pigs and place them in a feeding program.

There can be severe opportunity costs associated with such self-imposed or externally imposed requirements. At the producer level, the agricultural sector approaches the conditions of pure competition. The producer is a price taker and has little or no ability to influence price.

In an industry structure approaching the conditions of pure competition, there are few, if any, significant barriers to entry. New producers can come in or existing producers can expand by bringing in new capital. The result is that the market seldom discovers and offers prices for future delivery that open up a profit window over and above the price required to cover average total cost of production. *For the heavily indebted producer, this may mean having to pass the occasional opportunities that have a high probability of being profitable because of the lack of financial capacity.* The feeder pigs are not bought and placed into a feeding program that has a high probability of being profitable because the futures market never offers a guaranteed profit on the same day the pigs could be bought. Thus, the lack of financial capacity and the related conservative posture of the lender may place a serious constraint on what the firm can do and on the price risk management strategies that can be employed.

Later in the chapter we will come back to this point in discussing appropriate strategies for the producer with a heavy debt load. The complementary fundamental and technical analysis become extremely important in spotting opportunities that offer a high probability of profits. If the producer who is struggling with financing is denied these opportunities, both the producer and the lending agency are likely to suffer over time. After all, the need is for profitable ventures that contribute to the cash flow and enable the producer to service and reduce the debt load over time. The alternative is often a slow and painful exit from the industry, a process that was widely observed in agriculture during the early and mid-1980s and is starting to show up again in the dairy, swine, wheat and cotton sectors in the late 1990s.

Financial capacity comes into play in another important way in influencing strategies to be used in price risk management. A position directly in the futures always exposes the producer to the need for margin capital. The futures account must be margined initially and there must be adequate provision for funds to answer margin calls.

The lending agency is extremely important here. There must be recognition of the need for a separate credit line to handle margin needs. *As a producer, you should not be expected to handle margin-line needs from the production credit line or from personal funds.* There are countless examples of producers being forced to offset profitable hedges because of the inability to answer margin calls. If the price subsequently turns lower, as it often does, the producer who is in a poor financial position initially is then often denied the price protection that is so badly needed. A written agreement is needed that spells out the objective of the marketing plan. *The producer commits to the agreed-upon parameters in terms of how the futures or option transactions will be handled, and the bank commits to the needed margin funds.* The plan should be updated and modified based on experience and on an as-needed basis. Brokers should be brought into the planning process so that they know the objectives and the operating parameters as well.

If a credit line for margin needs is not available, the highly leveraged producer should select strategies that do not use the futures market directly. Cash contracts are a possibility. The margin requirements are transferred to the buyer. Options are another possibility if the producer has adequate capital to handle the initial option premiums. The cost of the price protection program is known up front when options are used and there is no exposure to the financial drain of margin calls.

The financial position of the firm will influence which price risk management strategy can be adopted. For the highly leveraged firm, it is important that the posture adopted not be so conservative that opportunities with a high probability of being profitable are ignored. Developing better understanding of price risk management strategies can help the highly leveraged firm take advantage of opportunities that offer a high probability of profit and can improve its financial position.

MANAGEMENT ABILITY

The abilities of the decision maker to manage exposure to price risk will clearly be an important criterion in selection of a strategy. A producer who is a skilled chart analyst or a producer who subscribes to the use of moving averages and understands their strengths and weaknesses is more likely to prefer a selective hedging strategy. Conversely, a producer who is poorly informed in charting techniques or does not feel that technical analysis is a valid analytical tool will make some other choice and be more likely to follow a conservative approach to hedging or to use options.

In either case, the ability of the decision maker as a fundamental analyst will be important. A selective hedging program, whether based on chart signals or moving averages, works best in a market that shows major and sustained price moves. If the underlying supply–demand situation is showing excessive ending stocks of corn, for example, major price increases in the coming crop year are not highly probable. Whatever the objectives of the producer, some approach other than a selective hedging approach might be in order.

To illustrate the impact of the fundamental outlook, it is useful to review its influence on the basic choice between direct use of the futures and options. In a market burdened by excessive stocks, the options can be a more expensive way to acquire price protection. Premiums do come down in the less volatile markets that emerge in the presence of burdensome stocks, but the time value of the options at planting time and early in the growing season keep the premiums relatively high. If no major price move develops because of the burdensome and excessive stocks and the markets trade sideways, the option value is likely to be at or near zero at harvest and the initial premium is forfeited. Price insurance was purchased via the options that was not, in an *ex post* context, needed. A position in the futures during that same type of market would cost commissions plus an interest charge on margin funds. The cost comparison could be between $.10 and $.20 per bushel of corn or more on the option premiums and $.02–$.03 per bushel when carrying protection directly in the futures.

An important thrust of this entire book is to describe and develop the abilities needed to effectively manage exposure to price risk. We have explained that fundamental and technical analysis are complementary. *That complementarity is apparent when it becomes clear that the management ability of the decision maker as a fundamental and technical analyst influences the selection of a pricing strategy.* As more specific strategies are illustrated in the following sections, the importance of both approaches to analysis will become even more apparent.

The ability of the decision maker as a technical and fundamental analyst will influence the choice of strategies. The more sophisticated strategies will be denied the manager who has few skills as an analyst of the fundamental price outlook, the technical picture in the market, or both.

MANAGEMENT STRATEGIES

There are numerous possible approaches to management of price risk.[1] To exercise a degree of control over the number of alternatives to be considered, the strategies developed will be related to the dimensions just introduced that would be expected to influence the choice of strategies. Strategies will be developed first for the risk-averse and conservative decision maker with limited financial capacity and limited analytical abilities. Strategies for the more nearly average decision maker will then be developed, leading up to coverage of strategies for the risk seeker who has substantial financial capacity, is a capable market analyst, and is a capable manager of exposure to price risk. You should be able to identify and adapt a strategy that fits your particular situation.

Conservative Strategies

For the risk-averse decision maker with limited financing and limited analytical abilities, a conservative approach will typically be best. Several alternatives are available, however.

Target Pricing *The primary objective is to ensure the economic viability of the operation.* Table 11.2 illustrates a reasonable approach for corn. Prorated per-bushel "charges" to allow servicing the annual debt and to cover living expenses for the family or to earn a preset return on the investment are added to the variable per unit costs of production. The result is a *target price,* the price needed to ensure economic viability. A strategy is then developed to secure the target price.

If a decision has already been made to plant a certain number of acres in corn, the immediate need is to ensure the target price. Given the limitations facing the producer, the most logical approach is to use a cash contract. Such an approach transfers the management of margins and the basis risks associated with a position in futures to the buyer. The coverage in earlier chapters indicates that it is the elevator, for example, who faces basis risk when a cash contract for harvest-period delivery is extended. To the producer, a contract price offer that incorporates a specific basis allowance means that they are apparently transferring both price and basis risk to someone else. It is important to keep in mind, however, that the elevator will tend to offer cash price contracts that, over time, transfer part or all of the basis risk to the producer. The cash bid will usually reflect some allowance for the elevator's exposure to basis risk, and that allowance gets imbedded in cash-futures basis patterns over time.

Not all the price protection has to be established at the same time, of course. Typically, producers will be willing to price some percentage of the expected production prior to planting and then add protection in increments until the desired level of protection is reached. Even though cash contracts are being used, *there are still ways to accomplish scale-up pricing once the target price is offered.*

[1]The strategies in this section are developed primarily from the viewpoint of the producer or holder of inventories who needs protection against declining prices. This is the more common need, but you are reminded that the strategies are appropriate for the buyer of grains, livestock, and so on, who needs protection against rising prices. Call options would be used instead of put options, and the buy signal from moving averages, for example, would be the signal on which long hedges are placed.

TABLE 11.2
Calculating a Target Price for Corn

Assigned Costs	Per Bushel
Variable costs, production	$1.60
Annual debt payment	.25
Family living*	.20
Target price	$2.05

*The "family living" prorated allocation could be based on a competitive return on the investment or a competitive salary for the manager instead of family expenses or living expenses.

The cash contracts offered by elevators for harvest-period delivery reflect an expected harvest-period basis adjustment based on historical data. There is no reason to expect that basis estimate to change significantly during the year, and that stability gives the producer an opportunity.

Elevator managers often keep a "wish book" with producers' names, number of bushels, and desired price levels. If the underlying futures market trades up, the cash contract offers by the elevator will trade up directly with the futures, reflecting a largely constant harvest-period basis allowance. *Without being involved directly in the futures, the producer is able to capture the benefits of a rallying futures market and price the product on a scale-up basis.* The elevators offer the cash contracts and then go short in the futures market when the cash contract is signed to protect the margin they have incorporated into the cash contract offer.

The simplicity of the target price strategy is appealing. With a target price established on something of a cost-plus basis, the first impression is that the producer is doing something about eliminating the problems of being a price taker. But that impression can be misleading, and there are in fact major shortcomings to this strategy.

Perhaps the most important disadvantage is the absence of any safety net to prevent a financially devastating dip in price. If the target price is never offered by the market, the producer is totally exposed to price risk and is caught in the role of a cash market speculator on 100 percent of the projected production. *The decision maker who is risk averse, in poor financial condition, and not a very effective market analyst faces the very real possibility of being totally exposed to price risk in the marketplace.* There is a need for a strategy that offers the appeal and simplicity of the target price approach but also offers protection against the major price break. Obviously, one approach would be to improve the analytical abilities of the decision maker and move to a more sophisticated and flexible strategy. But that improvement will take time, and not all producers will wish to become better analysts or be able to do so. Some other refinement is needed.

The simplicity of a target price strategy is appealing. The big shortcoming of the approach is the lack of any protection when the target price is never offered by the market. When that occurs, the producer who can least afford such an exposure may be totally exposed to price risk as a cash market speculator.

Target Pricing Plus What is needed is a safeguard against significant price breaks while the producer waits for the market to offer the target price. Virtually every refinement will require at least a marginal increase in access to financing and/or a marginal

move toward more sophisticated analytical abilities. But some refinements do in fact require only an incremental change and are consistent with the producer's risk-averse orientation.

The use of moving averages can provide the refinement and the much-needed safety net. A crossover set of moving averages, such as those described in Chapter 5, are mechanistic and totally objective in nature. No particular analytical skill is required, but it is important that the decision maker understand what the moving averages can contribute. Figure 11.2 demonstrates the protection that the moving averages can bring with a realistic situation. For illustrative purposes, a simple set of 3-day and 10-day moving averages is used.

Feeder cattle were bought in late July with the December live cattle futures moving up. A target price of $75.00 per hundredweight is needed to cover the costs of feeder cattle, feed, interest, other variable costs plus an overhead or fixed cost assessment. As a cattle feeder, you might believe price will go above $75.00 but feel a need to get some protection if the $75.00 price is reached.

The chart shows what happened. A price of $73.02 was reached on July 29, and then the direction of the price trend turned negative. Reports were showing large numbers of cattle being placed on feed, and the long-standing demand weakness for beef was also a factor. The market dipped to the $66.00–67.00 level, price levels that would mean up to a $108.00 per-head loss on a 1,200-lb. steer.

The moving average safety net program would definitely help. A short hedge was placed in early August near $72.00 and then lifted a few days later at a loss of some $.50 per hundredweight. The second sell signal came near $71.00 and the short hedge was lifted near $69.75. A third sell signal came near $69.25 and was lifted near $66.50

FIGURE 11.2
Demonstration of Moving Averages as a "Safety Net" in a Target Price Risk Management Program for Live Cattle

in early October. These three round turns generated a net of some $3.50 per hundredweight before commissions, and losses were reduced by some $42.00 per head.

In a market with sharp price movements as it trended lower, the moving averages helped to mitigate the financial burden on the cattle feeder. If the market moves still lower as December approaches, the protection in the form of short hedges would be reinstated on a sell signal from the moving averages.

With the grains and oilseeds, the decision on how much to price would still be a factor. Early in the year, the producer might opt to cash contract only 30–40 percent of expected production when the target price is offered the first time. If more is to be priced later *or* later pricing is to be at a higher price, the protection of the moving averages can be kept in place on the volume that has not been cash contracted. The procedure is thus a bit more complex with the grains, but is still quite manageable.

A simple program is to follow the moving-average signals on the number of bushels for which price protection will eventually be desired, say, 60 to 70 percent of normal production. As the initial target price objective is met and part of the crop is priced via a cash contract, the next position established via the moving-average signals would be on a smaller volume. Since the price target will be reached on a rallying market, it is unlikely that the moving averages will have short hedges in place when the initial cash contract is employed. If short hedges *are* in place, part of the short position in futures could be bought back to reflect volume now cash contracted.

The moving averages will not always be totally effective in providing backup protection, of course. The example with the cattle feeding program showed that only partial protection was present. If the market does work slowly higher to the target price, any hedges that are periodically placed and then lifted will probably be losing trades. *In an upward-trending market, it is virtually impossible for a selective hedging program that is periodically short in the market and then periodically out of the futures market to be profitable.* Any losses have to be viewed as a cost of having the safety net price protection in place. In markets that show major price breaks, *the moving averages will always have the producer short in the market* and provide the all-important protection without the extensive margin calls that can come when a short hedge is held in place while the market rallies.[2] In addition, the moving averages will never allow major accumulation of margin calls in an upward-trending market. Keep in mind that one reason this decision maker is using cash contracts is lack of financing for such outlays as margin calls.

Another simple refinement or extension that can provide a safety net for the target price strategy is to buy an out-of-the-money put option. By picking a strike price that would at least cover the variable costs of production, the producer has protection against a price break that might put the firm out of business.

The producer should buy put options to cover all of the expected production base that will eventually be cash contracted. In livestock programs, this would mean that essentially all the hogs or cattle would be priced if they are already in the feeding program. In grains, options should be bought relatively early on 60 to 80 percent of the

[2]It is important, remember, to use the correct set of moving averages for a particular commodity. The appendix to Chapter 5 provided suggestions based on our research and experience and shows extensions and refinements that could improve the performance of any selected set of averages. The potential user is encouraged to test several sets of moving averages to see which set appears to be most effective. It is a good idea to use the systems diligently "on paper" using an electronic market analysis package before actually taking market positions using the moving averages.

expected production or whatever level will eventually be cash contracted. One of the advantages of using put options is that in the event of a total or partial crop failure, there are no losses from short hedges in an upward-trending market. The only exposure is the premiums if the producer ends up pricing more via the options than is produced.

Buying an out-of-the-money put option keeps the cost of the program down and is consistent with the limited financial position. In addition, buying put options requires no sophisticated analytical ability. *The important point is that protection against bad price breaks is in place while waiting for the target price or prices to be offered.*

If the target price is reached and cash contracts are established, the option premiums will be forfeited if the market continues to trend up. If, after the cash contracts are set, the market turns lower, the put options have a chance to pick up value. It would be unusual to see the put option premiums at the close of the year exceed the premiums paid when the out-of-the-money put options were purchased, but that could certainly happen if the market declines sharply. There is thus always a chance that the put option will pick up at least some value and reduce the cost of the safety net protection if it is kept in place.

Another approach, of course, is to sell or offset the put options as the cash contracts are established. Premiums at the time the cash contracts are secured will typically be lower than when the options were bought since the price target will be above the levels offered by the market when the options are initially bought as a safety net measure. But the premiums will not necessarily be near zero. If it is early in the year, there will be significant time value still being reflected by the option premium. A $2.60 put option on December corn, bought at $.25 per bushel in late April, might still be trading at a premium of $.05 per bushel in early June when the December futures have traded up to $2.75 and the first price objective is met. If the options can be sold at $.05 per bushel, the effective cost of the safety net protection is reduced to $.20 per bushel plus commission costs.

Whether the options are sold or held should be determined largely by when the cash contracts are set (which will determine the time value of the options) and where the prices are in the projected price range for the year. If the options are bought as a safety net backup when the futures price is near the top end of the projected price range for the year, chances are they will later be in-the-money and provide a substantial premium if held. This can be more profitable than following a strategy in which the options are always sold when the cash contracts are established. Conversely, if the put options purchased are near the bottom end of the projected price range, the strategy of selling the options when cash contracts are set to realize any remaining premium tied to the time value would probably be more effective. Once again, we see the importance of fundamental analysis in projecting the probable price range for the year.

The target price strategy looks appealing, but it can be very dangerous. It is important that the potential user fully appreciate what will happen if the target price is never offered and there is no safety net in place. It could mean the demise of the business.

Using moving averages or a relatively inexpensive put option can provide a safety net of protection if the target price is never offered. You gain protection against a potentially ruinous price move, but the added feature will typically increase the cost of the program compared to just using cash contracts. The objective, of course, is protection against a major price break if the target price is never offered.

Trend Line Pricing An alternative to the target price approach is to establish price protection using the sell signals generated by trend lines. The trend line is one of the most simple chart techniques and can be used in a conservative hedge program by the risk-averse decision maker. Not much analytical ability is required, but the limited financial capacity could be strained unless the pricing is done via cash contracts.

If a trend line can be fitted to an upward-trending market early in the decision period, the decision maker can then use a close below the trend line as a signal to move aggressively in establishing cash contracts. Figure 11.3 illustrates with the March 1998 corn futures. A trend line connecting the lows in July and the lows in early October fits all the criteria of trend lines in Chapter 4 and allows the corn producer to relax. *There is no compelling reason to seek price protection until a change in trend is signaled via a close below the trend line.* The price risk associated with holding 1997 corn in storage is obviously still present, but it may be a type of risk exposure even the risk-averse producer will be willing to accept. Prices are in an uptrend, and as long as that positive direction is intact, the producer is benefiting. But you have to be prepared to extend that line and seek contract protection on a close below the line.

One additional appealing feature of this relatively conservative and simple strategy is the potential it offers to avoid suffering a major opportunity cost. If the market is in a major uptrend when the target price is reached initially, setting the price at that point via cash contracts can leave the producer open to the frustrations of watching the price levels move up after the price has been set in the cash contract.

If such a major uptrend does develop, the producer of a planned or growing crop still faces the tough decision of how much to price when the sell signal is generated at some level above the initial target price. The buyer in the cash contract will expect

FIGURE 11.3
Demonstration of an Uptrend Line on the March 1998 Corn Futures Chart That Would Encourage Waiting on Placement of Short Hedges for a Storage Strategy

delivery of the physical product, and any "buyout" of the cash forward contract is usually expensive. *This is clearly a complication of cash contracts compared to a scale-up approach above a target price directly in the futures market or to a strategy using put options.* The short positions in futures can be bought back. For an options-based strategy, the only exposure in the event of a partial crop failure is the option premiums. Cash contracting more than is produced can be very expensive if the producer has to go into a high-priced cash market and buy grain to meet contractual commitments. Nonetheless, the appeal of the chart pattern shown in Figure 11.3 is apparent. As long as the uptrend holds and no close below the trend line is observed, the producer is in a position to benefit as the market moves above the target price. And for a stored crop, there is little worry about not having enough bushels.

There is the very real possibility, of course, that no easily recognized and sustained price uptrend will develop. If the market works higher without exhibiting a sustained trend, the producer can go straight to the target price approach. The objective is to get coverage at levels the firm can live with, and the target price approach can be used if the price targets are reached before a recognizable uptrend develops.

Clearly, there is the need for a safety net if the producer is monitoring the chart patterns and waiting for trend lines or target prices to appear. Either of the safety factors discussed in the target price section could be employed. Moving averages can provide protection, or the producer can buy an out-of-the-money put. Once a clear trend line is positioned by connecting two lows such as those in Figure 11.3, the need for a safety net is diminished. The producer now has "protection" via the anticipated sell signal. As soon as the prices rally from the lows in early October for three to five days, any short hedge position using moving averages (the averages should *not* be short, or would show a buy signal to lift short positions within a few days) could be removed or any put options sold at remaining premium value as the uptrend continues. *Then, it is very important that the markets be monitored carefully and that the hedges or cash contracts be set promptly when a close below the trend line generates a sell signal.*

A sell-stop-close-only order set on or just below the trend line will work on commodities where the exchanges accept the order. On the exchanges where the order will not be accepted, the producer will need to watch developments and place orders with the broker when the trend line is penetrated. The simple sell-stop order that is placed just below the trend line will also work and is accepted by all exchanges. Check with your broker to find out what orders you can use for your commodity. If needed, review the appendix to Chapter 4 which discusses types of orders in detail.

If the market is in an uptrend early in the production period, the sell signal generated by a close below the trend line can be an effective and conservative approach. A complication emerges in the form of having to decide how much to price when the sell signal is observed. If no clear trend line develops, the need for a safety net strategy is still present as the producer awaits development of a trend line or realization of target prices.

Intermediate Hedging Strategies

The decision maker described here is willing to accept some risk when the potential returns appear to justify the risk exposure. Financing is assumed adequate to allow the direct use of futures if that approach is preferred, and a separate credit line is available

Trend Line Pricing An alternative to the target price approach is to establish price protection using the sell signals generated by trend lines. The trend line is one of the most simple chart techniques and can be used in a conservative hedge program by the risk-averse decision maker. Not much analytical ability is required, but the limited financial capacity could be strained unless the pricing is done via cash contracts.

If a trend line can be fitted to an upward-trending market early in the decision period, the decision maker can then use a close below the trend line as a signal to move aggressively in establishing cash contracts. Figure 11.3 illustrates with the March 1998 corn futures. A trend line connecting the lows in July and the lows in early October fits all the criteria of trend lines in Chapter 4 and allows the corn producer to relax. *There is no compelling reason to seek price protection until a change in trend is signaled via* **a** *close below the trend line.* The price risk associated with holding 1997 corn in storage is obviously still present, but it may be a type of risk exposure even the risk-averse producer will be willing to accept. Prices are in an uptrend, and as long as that positive direction is intact, the producer is benefiting. But you have to be prepared to extend that line and seek contract protection on a close below the line.

One additional appealing feature of this relatively conservative and simple strategy is the potential it offers to avoid suffering a major opportunity cost. If the market is in a major uptrend when the target price is reached initially, setting the price at that point via cash contracts can leave the producer open to the frustrations of watching the price levels move up after the price has been set in the cash contract.

If such a major uptrend does develop, the producer of a planned or growing crop still faces the tough decision of how much to price when the sell signal is generated at some level above the initial target price. The buyer in the cash contract will expect

FIGURE 11.3
Demonstration of an Uptrend Line on the March 1998 Corn Futures Chart That Would Encourage Waiting on Placement of Short Hedges for a Storage Strategy

consolidation pattern a top, and will keep the long hedge in place or keep the potential short hedger in the posture of a cash market speculator. This performance issue was discussed in Chapter 5 and in the appendix to Chapter 5.

The second visible difference in performance comes when the market is trading sideways and is exhibiting frequent and choppy price moves. Depending on the frequency and amplitude of the moves, the shorter set of averages that generates more signals may be able to avoid being wrong in the market and may even generate primarily neutral or profitable trades. A longer set of averages that is slower to generate signals can be caught generating a sell signal when the market is ready to turn higher for several days, or a buy signal when the market is ready to turn lower.

Critics of moving averages are quick to point to the tendency to generate frequent and losing trades in the choppy markets that are showing no major trends. Advocates will argue that any losses during such periods are nothing more than insurance premiums that have to be paid to ensure that the short hedge, for example, will be in place for the bulk of the major price break and have the producer off the short hedge for the bulk of the major price rally.

It is easy to see both the strong and weak points of the moving averages using the December 1997 lean hog futures shown in Figure 11.4. Picking up in early February, the 3–10 set of moving averages would have generated 10 sell signals by mid-October. Examination of the performance of the moving averages shows several sell signals that were, in hindsight, wrong. The brief rally in early June, for example, generated a buy signal and removed the short hedges—only to see them replaced a few days later. Essentially the same thing happened in early September. But the other side of the issue, the advantages of moving averages, is also clearly present.

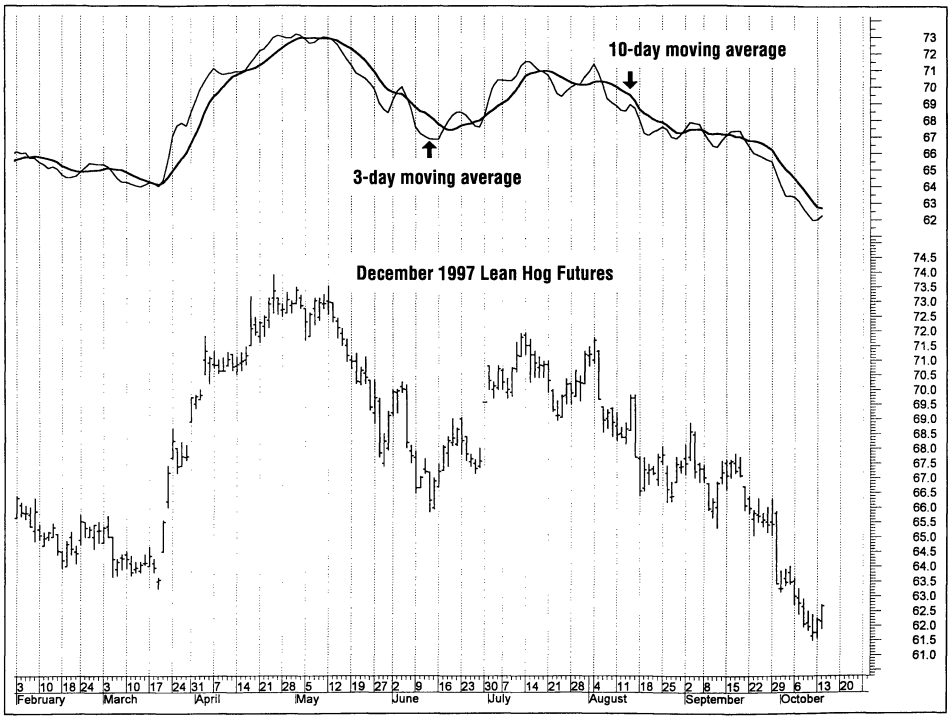

FIGURE 11.4
Performance of Moving Averages in a Major Bull Market in Hogs

Early short hedges would have been lifted by a buy signal on March 20 when the market closed at $65.50. The benefits of much of the rally that reached $73.90 on April 24 were realized. The next sell signal occurred on May 5 at a close of $72.30. Those short positions were quickly bought back and then the system turned short again at $72.45 on May 13. Those hedges were lifted on June 3 at $69.95, and then replaced again a few days later. During August and September, the volatile market brought an "on again, off again" status that you would prefer not to see, but since the market was trending lower, most of the transactions would have been profitable after commissions.

The key is that the positive features of moving averages are present. During the major price rally in March and April, the benefits of a rising cash market were there. No margin calls accumulated. Then, protection was in place for much of the price break during May and June. A safety net feature is clearly present. And if you want to eliminate those "mistakes," you can do it by going to a longer set of moving averages such as the 9 and 18. But you pay in other ways for the reduction in trades. With the 9 and 18, the buy signal to lift short hedges would not have been seen until March 24—and the closing price is up to $68.25. The subsequent sell signal to replace the short hedges would not have occurred until May 14 at $72.10. These hedges were lifted on June 26 at $67.32, an impressive performance during the downtrend.

Overall performance of such a moving average strategy will tend to smooth the net return flow over time. Whether the average profits will be above or below the average for the cash speculative position will depend on the market patterns (frequency and amplitude of price moves) for the particular commodity and how effective the decision maker is in selecting the correct set of moving averages.

Figure 11.5 documents the advantages of moving averages as discussed in Chapter 5 and shows why many users swear by moving averages. The average monthly per head return to the computer-simulated cattle feeding operation in the research on which this chart is based is increased *and* there is a major improvement in the stability of the monthly cash flow over time. The distribution of the monthly net returns is altered. There are fewer large losses and a higher frequency around the average level of net returns. The large windfall gain to the cash market speculator is also eliminated by the losses that a moving average strategy tend to register during an upward trending market, but the elimination of the large losses is the key. *For a decision maker who wishes to avoid major exposure to price risk and who does not have unlimited capital, the moving averages may in fact be a preferred strategy.* Profit performance can be improved and/or stabilized with a strategy that does not require exceptional capacity as a fundamental or technical analyst by simply following a workable set of moving averages.

Moving averages assist the decision maker in efforts to gain protection against major price moves and put the selective hedger in the position of being a cash market speculator when the price trend is in his or her favor. The big disadvantage of moving averages is the losses that tend to accrue in choppy, sideways markets. It is important to select the correct set of moving averages for a particular commodity, and the system must be employed in a disciplined way. The signals must be followed and not overruled in a subjective or judgmental way.

Strategy II: Moving Averages Plus As referenced in Chapter 5, a number of analysts have conceptualized and tested refinements that they argue will improve the performance of even the correct set of moving averages. Coverage here cannot be

exhaustive, but selected refinements can be introduced fairly easily. The references at the end of the chapter provide more detail. You are reminded that the appendix to Chapter 5 covers these refinements in a procedural context.

One approach is to use a penetration rule. When a set of moving averages makes a mistake, such as prematurely calling a top in the market, the decision maker usually sees the short average drop only slightly below the longer average and then quickly move back above the longer average. This scenario developed on the hog futures shown in Figure 11.4 during mid-April. Note the 3-day average equaled the 10-day, but did not move significantly through it.

The initial long positions were still correct, however, and there is no top in the market as yet. To avoid this type of mistake, and it is evident on the hog chart in Figure 11.4 on other occasions, an added requirement is imposed. The shorter average must penetrate the longer average by a preset amount or the signal is ignored.

Exactly what penetration requirement to impose is a researchable issue. Available research referenced in Chapter 5 suggests increments around $.15 per hundredweight for livestock and $.01, $.02, and $.03 for corn, wheat, and soybeans, respectively. Historical data sets can be analyzed by computer programs designed to isolate the optimum penetration increment, and that type of analysis is now within your reach with spreadsheets or computer software packages readily available in the market.

A second refinement is to use a third or leading moving average. If the base set of averages is a 9–18, for example, a shorter average can be used to confirm the buy or sell signal. A widely used and widely available set (on many electronic systems) is the 4–9–18, in which the sell or buy signal is confirmed by the 4-day moving average. Once again, you will find discussion in Chapter 5 and detailed discussion of this refinement in the appendix to Chapter 5.

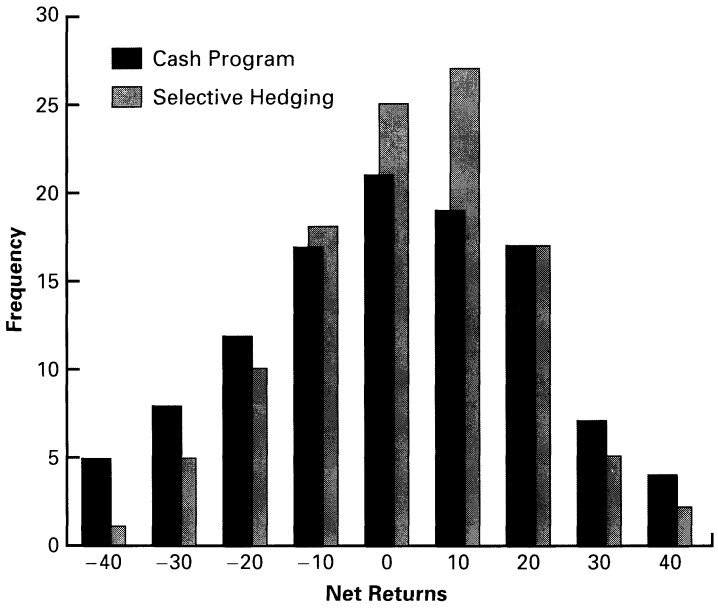

FIGURE 11.5
Impact of a Moving Average Selective Hedging Program on the Mean and Dispersion of Net Returns to Cattle Feeding in the Texas-Oklahoma Area

Source: Don Riffe and W. D. Purcell, *Hedging Strategies to Protect the Financial Positions of Cattle Feeders and Lenders,* Okla. Ag. Exp. Sta. Bul. B-743, Stillwater, Oklahoma, June 1979.

If the 9-day average crosses the 18-day average from above, the sell signal is confirmed if the 4-day average leads the 9-day average and is below the 9-day average when the sell signal is generated. The logic to the approach is appealing. If the signal generated by the 9-18 is one that, *ex post*, will be seen as a premature calling of a top in the market, then the use of the confirmed average can help eliminate the mistakes. In an upward-trending market that consolidates briefly and then resumes the upward trend, the 4-day will turn up more quickly than the longer moving averages as the consolidation pattern is completed, and the premature sell signal may not be confirmed.

Both the penetration rule and the leading moving average have the potential to reduce the number of trades and improve the net performance of the selected set of moving averages. Performance will be improved in instances in which premature tops and bottoms would otherwise be signaled and in the choppy sideways pattern which frequent trades would otherwise be generated.

A third way to improve the performance of moving averages, also introduced in Chapter 5, is to use the relative strength index as a safeguard against incorrect signals near the tops and bottoms in the market. If a buy signal is generated when the RSI is above 70, that signal could prompt the buying back of short hedges in a market that is overbought and ready to turn lower. Buy signals that occur when the RSI is above 70 could be ignored.

Near the bottoms in the market, sell signals that occur when the RSI is below 30 would be ignored. Thus, the RSI provides protection against the incorrect signals that may occur near tops and bottoms. It is mistakes at those levels that detract from the performance of the moving averages.

In the choppy and sideways markets, the RSI will not offer significant help. It is seldom that the markets are overbought or oversold, based on typically used RSI levels, in this type of market pattern. Some other safeguard must be applied. The penetration rule or use of a third or leading moving average can be employed.

> **The use of penetration rules, leading (shorter) moving averages, and the RSI can reduce the number of trades signaled by moving averages and improve their performance. Much of the improvement comes via preventing the premature calling of tops or bottoms and the related reduction in the number of trades.**

Strategy III: Fundamental and Technical Analyses Combined The use of the standard bar chart buy and sell indicators is one of the most widely used approaches to a selective hedging program. Hedgers must be in a position to finance margin calls, but they will seek to lift or offset the hedge when the appropriate buy signal emerges. That should preclude the extended margin calls that come with a more conservative approach that does not allow the lifting and possible replacement of hedges. *The decision maker who selects this strategy must have both fundamental and technical analytical skills.*

On the fundamental side, the first need is to project the likely direction of any major price trends and/or to establish the probable price range within which trade will occur. It does no good to watch for a chart signal to suggest a short hedge be placed around $4.00 in corn or around $80.00 in fed cattle if those prices have little or no chance of being reached. Before turning to a demonstration of the use of the bar chart signals, therefore, it is important to look at fundamental analysis at a level the average decision maker being discussed here could be expected to handle.

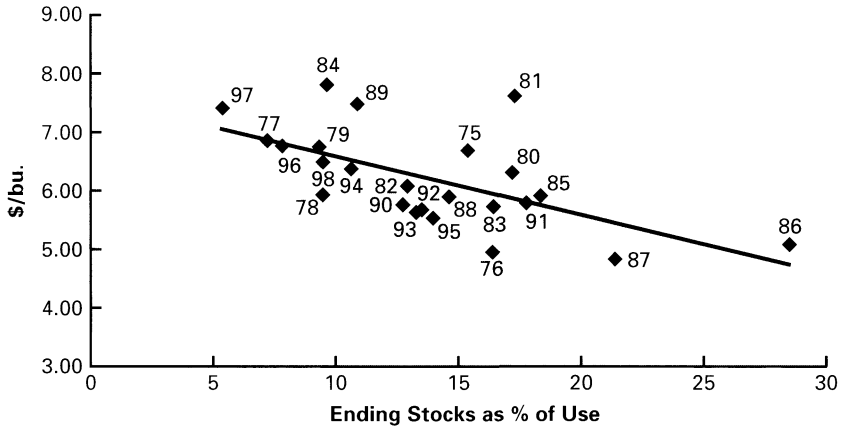

FIGURE 11.6
The Relationship Between Price and Ending Stocks as Percent of Use, Soybeans, 1975–1998

For grains, the relationships between price and ending stocks as a percent of total use for the crop year provides a simple but effective way to analyze the supply–demand fundamentals. Developments build on the discussions and presentations of Chapter 3 and extend the analysis to a particular decision situation. Soybeans will be used to illustrate.

The World Agricultural Supply and Demand Estimates reports first introduced in Chapter 3 provide the data needed to estimate a relationship between ending stocks and prices. Figure 11.6 shows the fitted relationship for soybeans that was developed in Chapter 3.[4] The years shown in the plot are the second year in the crop year, so 97 refers to the 1996–97 crop year that ended August 31, 1997.

Early in the year, an estimate of the yearly average price received by farmers can be generated by using the estimates of ending stocks and total use from the most recent supply–demand report released by the USDA. Calculate ending stocks as a percentage of total use and locate that point on the horizontal axis. Then, move up vertically to locate the corresponding point on the function. By coming across horizontally to the vertical axis, a price estimate is generated.

Table 11.3 illustrates the calculations from the algebraic equation with a final price estimate of $6.84 per bushel for soybeans. This approach looks more sophisticated, but reading the price off the chart will be very effective. There is too much variation in this relationship to worry a great deal about precision in numbers.

The 5.4 used in the equation in Table 11.3 reflects the last available estimate of total usage (2.444 billion bushels) and ending stocks (132 million bushels) for the 1996–97 crop year. The $6.84 estimate is for the average cash price to farmers for the 1996–97 year. At the time of the update, the November 1997 soybean futures were trading near $7.00 with a life-of-contract trading range of $5.97 to $7.17. The midpoint of that range is $6.57. Both the $6.57 and the current trading level of $7.00 are generally consistent, after basis allowances, with a $6.84 cash price.

[4]The equation is in Appendix 3B of Chapter 3. For the decision maker without access to a fitted equation, a useful approximation can be generated by simply looking at the scatter plot. Sketch in a curvilinear or linear function that is placed so that deviations or "misses" by the points above the line offset or match the deviations below the line. In other words, the deviations from the line that is being sketched should sum to zero. The result will be a quite useful approximation of a fitted mathematical function.

TABLE 11.3
Calculating an Estimate of the Season Average Price for Soybeans Using the Price–Ending Stocks Relationship

The general form of the model is:

$$PR = a + b_1 ES$$

where

PR = season average price ($ per bushel) and
ES = ending stocks as a percent of use.

The fitted model was:

$$PR = \$7.38 - \$0.0995 \text{ (ES)}.$$

If the estimate of ES is 5.4, the projected price will be

$$PR = \$7.38 - \$0.0995 (5.4)$$
$$= \$6.84 \text{ per bushel}$$

Given the estimate of the general price level for the year, attention then turns to the need for some idea of the price range that will be needed to capture the average price for the year. A very simple approach is to examine the deviations above and below the line and convert those to price equivalents. Most crop years in Figure 11.6 would be within $ 1.00 per bushel of the fitted line. A range of $6.84 plus and minus $1.00, or $5.84 to $7.84, would contain the average price with a very high degree of probability.

If the decision maker understands basic statistics, a confidence interval can be calculated around the estimated price using the standard error of the regression. A 95 percent confidence interval, the interval within which 95 of 100 repeated observations would be expected to fall, is calculated as price plus and minus 2 standard deviations.

Readers with awareness of statistical measure of dispersion, such as standard deviation will have no problem with this approach. Others might prefer to just use the deviations from the fitted function based on visual inspection and not get involved in the statistics.

Whichever the approach taken, it is important to keep in mind that the relationship is between ending stocks as a percent of use and the average cash price for the crop year. Day-to-day or any short-run prices would be expected to vary over a wider range than the range that is likely to contain the average price for the year.

A simple but effective alternative to the single-equation model approach involves the use of an *elasticity framework*. For many users, this may be the preferred approach because the only data required are estimates of the period-to-period changes in quantity produced. This approach was covered in general terms in the discussion of fundamental analysis in Chapter 3.

Table 11.4 expands the presentation to another commodity and demonstrates an approach to estimate slaughter hog prices. A demand elasticity of –0.6 is employed and the expected price for year 2 is generated. The usefulness of the approach depends on the accuracy of the elasticity coefficient, and it requires that the user be fully aware of the implicit assumptions being employed. Keep in mind that demand elasticity is simply percent change in quantity divided by percent change in price. In Table 11.4, the expected 5 percent increase in production translates to an 8.3 percent projected decrease in hog prices.

Using projected quantity changes and the own-price demand elasticity of –0.6 to generate a price estimate *assumes that the demand for hogs is constant on a period-*

Year t, quarter 1: Price = $53.00 per hundredweight

Based on projections from the USDA quarterly *Hogs and Pigs* reports, production for year t+1, quarter 1 is expected to increase by 5 percent. Using a demand elasticity for hogs at the farm level of –0.6, the expected price change for year t+1, quarter 1, would be calculated as follows:

$$-0.06 = \frac{+0.05}{X} \qquad X = -0.083$$

where X is the expected change in price given the elasticity of –0.6 and assuming that demand for hogs does not shift.

Therefore:

Price year t + 1, quarter 1
= $53.00 – $.083 ($53.00)
= $53.00 – $4.40
= $48.60

TABLE 11.4
Demonstration of the Elasticity Framework in Projecting Year-to-Year Hog Prices

to-period basis. If the demand function itself is shifting, then the price estimate will be too high or too low, depending on the direction of the shift in demand. The price estimate generated under the initial assumption that the level of demand is constant is an excellent place to start, however, because demand does not typically change a great deal from quarter to quarter or even year to year. *It is the price–quantity relationship captured by the demand curve that dominates in importance in determining price, and shifts in supply along that demand curve can be converted to price changes using the elasticity framework.*

An obvious shortcoming of the elasticity framework approach is the absence of any formal way to place a confidence band around the estimate to help in generating expectations of the probable price range for the year. By going back and applying the procedure across several historical years, you could generate estimates of the errors in the estimation process and the variation of monthly or quarterly prices around the estimate. This process was mentioned in Chapter 3, and the results, in terms of accuracy, appeared reasonable and useful. It is important that you keep in mind that it is just the expected changes in quantity that are being used to estimate price through the elasticity framework. Demand is being held constant. A model this simple, it is really just $P = f(Q)$, is not going to be completely accurate in a complex marketplace.

Any possible shifts in demand can be incorporated, of course. Demand will shift due to changes in tastes and preferences, changes in consumer incomes, and changes in prices of other products. On a year-to-year basis, tastes and preferences are not likely to vary a great deal, and consumers' incomes will not change enough to make a major difference. In the short run, changes in the prices of important substitute products can influence demand.

A published demand analysis[5] estimated the cross-elasticity between beef and pork to be 0.369. This suggests that a 1.0 percent change in beef prices would prompt a 0.369 percent change in pork consumption in the same direction, all other factors equal. This cross-elasticity measure of the relationship between beef and pork provides a mechanism to account for demand shifts due to changes in the price of substitute products.

[5]Reference is to Wayne D. Purcell, *Analysis of Demand for Beef, Pork, Lamb, and Broilers*, Res. Bul. 1-89, Research Institute on Livestock Pricing, Agricultural Economics, Virginia Tech, Blacksburg, VA, July 1989.

Incorporating this into the illustration on year-to-year changes in hog prices is a bit complicated, but it is worth the effort. *At a minimum, the decision maker should know the direction in which hog prices would move for given changes in the cattle sector.*

In the example in Table 11.4, the quantity of pork for quarter 1 of year $t + 1$ has been predicted and set. If cattle prices are projected by the USDA or a private-sector advisory firm to increase by 5 percent, what will this mean to the hog prices? To convert to price equivalents, we can look at it as if the expected 1.85 percent ($0.05 \times .369$ gives 0.0185) increase in quantity of pork is being denied the consumer and convert it to price implications as follows:

$$-0.6 = \frac{-0.0185}{X}.$$

Here, X is the percentage change in price that is associated with the inability to increase quantity—that is why the negative sign is shown on the –0.0185. Solving for X, we get

$$X = 0.031.$$

The revised hog price for quarter 1 of year $t + 1$ is therefore

$$\$48.60 + .031\ (\$48.60) = \$50.11.$$

This analysis takes liberties with the underlying theoretical framework. Technically, the cross-elasticity of 0.369 is applicable only at the retail level and should not be applied directly to the live hog price calculations. *But the primary need here is to make sure you appreciate the importance of our decision maker understanding the direction of the expected price impact.* Beef is a substitute for pork. If beef prices are expected to go up, the demand for pork—and the derived demand for hogs—will tend to increase as well. The final price of $50.11 shown in Figure 11.7 comes from (1) a price decrease from $53.00 to $48.60 if the only change was in pork supplies, and (2) a shift in demand for pork due to higher cattle prices that pushes the price back up to $50.11.

This conceptual framework as a way of thinking is what is important—and it has broad applications. Without knowing the detail of how soybean meal and corn substitute for each other in livestock ratios, it is important to understand that increases in the price of corn will increase the demand for soybean meal and therefore increase the price of soybean meal, other things being equal. A decision maker of intermediate ability needs this framework.

Given an initial projection of price for a livestock or a grain commodity[6] and the establishment of a possible price range, the decision maker is then in a position to use

[6]Keep in mind that the USDA is offering the results of this type of analysis in its projections on production and prices in the *Livestock, Dairy, and Poultry Situation and Outlook* report and situation and outlook reports for feed, wheat, oilseeds, cotton, and wool, and so on, available by subscription. It is thus less important that you be able to do the analysis than it is that you at least understand what is done by the USDA or the state-level extension specialist. The available forecasts will then be used with more confidence. These outlook reports are available at http://www.mannlib.cornell.edu/usda/ (select ERS button) on the Internet, and the supply–demand reports are at the same address (but select the WAOB button).

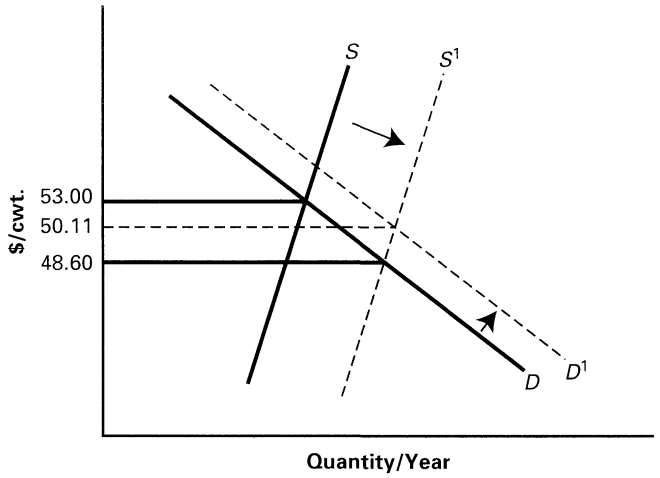

FIGURE 11.7
Demonstration of Price Implications of a Change in Supply and Demand Shift Due to Change in Price of a Substitute Product

the chart signals. The bar chart patterns likely to be employed by the user of intermediate strategies are the same patterns that were discussed at some length in Chapter 3. In this chapter, the use of the chart will be demonstrated via tracing through the array of decisions that would face a corn producer starting in the spring of the year after the decision has been made as to how much acreage to plant in corn. *Keep in mind that once an estimate of the direction of year-to-year changes in price and a probable price range have been established, the procedures will then be essentially the same whether it is a growing corn crop, hogs in a feeding program, or cattle that have just been placed in the feedlot.*

The assumptions being employed are the following:

1. The producer will follow a selective hedging strategy;
2. There are adequate funds in a margin line to allow forward-pricing directly in the futures market;
3. Historical basis data for the fall or harvest period are available;
4. The producer understands the use of options; and
5. Historical data indicate the producer will harvest at least 75 percent of his or her normal yields in any given year.

Prior to employing chart signals, fundamental analysis is needed to determine the general level of price expectations. Alternatives vary, ranging from formal price forecasting models to simply plotting basic price-quantity relationships. The need is an estimate of the probable price range within which bar chart signals can be employed in a selective hedging program. The user must either do the analysis or have some understanding of the process behind forecasts available from the USDA, university extension specialists, or private consultants and advisory firms.

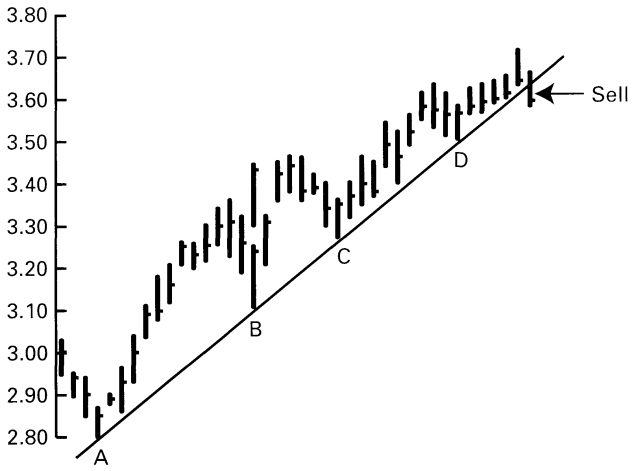

FIGURE 11.8
Bar Chart for December Corn Futures

Pricing Decision Process: Bar Chart Signals In late March, the producer starts monitoring the December corn futures. The contract has been trading since the previous August and shows the pattern exhibited in Figure 11.8.[7]

An initial sell signal is generated in mid-April when an uptrend line is penetrated. Figure 11.8 demonstrates, with the close below the trend line confirming a reversal in the direction of price trend. The producer notes that the trading volume is relatively high the day the trend line is penetrated, and he also observes that the RSI had been approaching an overbought condition. Both of these developments reaffirm the sell signal, but the close below the trend line is sufficient. The producer sells enough 5,000-bushel contracts on the CBOT to forward-price or hedge 30 percent of expected production at $3.50 per bushel by placing a limit-price order with the broker the next morning.[8] The order is placed at the closing price for the prior day, the last day shown in Figure 11.8, and is filled shortly after the opening of trade. The producer knows that the trading range for any particular day will include the previous day's close most of the time.

With short hedge protection in place on 30 percent of the expected crop, the producer now faces a decision of either (1) when to lift the hedges, or (2) when to add to the hedges if no buy signal is generated before another sell signal emerges. Corollary with these issues is the perpetual question of which trend lines to draw, a question that is always there for the chart analyst. Given the price scale on the charts, the producer tries to stick with trend lines that (1) are not more than 45 degrees in slope and (2) have the two connecting points at least 10 trading days apart. The idea, as was discussed in

[7]For ease of exposition, the constructed chart patterns shown in this chapter will not represent as many trading days as would be shown during an August-to-March period. This abstraction should not in any way detract from the usefulness of the developments in the chapter. The objective here is to demonstrate, not to try to convince the reader that the chart patterns appear on real-world charts. Those illustrations have been shown throughout the book.

[8]The 30 percent is a judgment call that may be influenced by how high in the projected price range for the year the market is trading when the sell signal occurs. If the $3.50 price is near the 50th percentile in the price range, for example, the producer may be less aggressive than if the sell order had occurred near the high end of the expected price range.

Chapter 4, is to try to stick with the major trends and avoid getting caught up in the short-run gyrations in the market.

After the short hedges are established, the market works lower for several days. A correction of the dip in prices then emerges, and the rally retraces roughly 38 percent of the down move in price. Open interest declines on the price rally, and trading volume is relatively light. Both patterns suggest a short-covering rally and the producer anticipates that prices will turn lower again.

A relatively weak close on the day the 38 percent correction is completed suggests that the rally has run its course. The next day the market gaps down and the downward move is resumed. After three days of lower prices, a downtrend line could be drawn across the price high for the day the 38 percent corrective rally was recorded and the producer starts to wish he had more than 30 percent of the crop hedged. But it is still early and the planting process is just starting to move into full swing. Remembering the need to be disciplined, the producer refuses to rush in and sell in the now-lower market. A decision is made to monitor the chart actions and wait to see what develops. In actuality, the producer is speculating in the cash market on the 70 percent of the crop that is not priced.

Later in the planting period, the weather patterns turn dry and there is talk about the possibility of germination problems. The market responds to the concerns about the weather, and prices start to move higher. In early June, the market closes above a downtrend line that could now be shown on the chart, and the short hedges are lifted by a buy-stop order that had been placed about 1 cent above the trend line and lowered every day by the producer's broker. The hedges are lifted at $3.20, giving a net profit before commissions of $.30 per bushel. *The producer is now a speculator in the cash market, has no hedges in* place, *and is elated with the success to date* with *the selective hedging efforts.*

The markets have a way of restoring humility, however. A resistance plane is drawn across the high recorded on the earlier 38 percent correction, and the short hedges are replaced by a limit-price sell order at $3.29 as the market rallies toward that plane. Consistent with accepted techniques, the producer places the order just under the resistance plane that crosses near $3.30. After all, prices were as low as $2.80 earlier, and the producer remembers wishing that more than 30 percent of the expected crop had been hedged. It is early June and most of the corn is up and growing nicely. This time 50 percent of the crop is hedged.

But the dry weather patterns persist, bringing changes in the USDA's estimates of supply for the year and the market pushes up toward the life-of-contract high at $3.60. Several margin calls are answered and the producer watches as the price levels climb quickly higher. After the second consecutive close above the contract high at $3.60, the producer follows through on preestablished plans and lifts the short hedges that were placed earlier at $3.29. The broker, following an agreed-on procedure in the marketing plan involving producer, banker, and broker, had entered a market order to buy near the close as the second close in new, higher prices emerged. The order is filled at $3.65, yielding a net loss of $.36 per bushel before commissions. Figure 11.9 illustrates this. *The producer now has a net per bushel loss in the futures account, but is back to a cash market speculator status and is in position to benefit if the market continues to rally.*

A few days later, in June, widespread rains come to the Cornbelt, and the market moves rapidly lower. A key-reversal top is recorded. A limit-price sell order at the closing price of the key-reversal day is not filled on the following trading day. The market moves lower, and the producer hedges 60 percent of the expected crop via a sell-stop

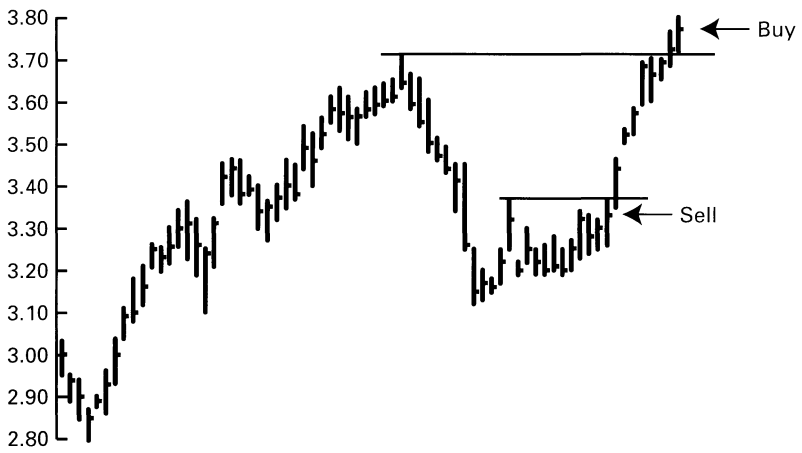

FIGURE 11.9
Demonstration of Covering Short Hedges at Contract Highs on the December Corn Chart

order placed under the latest uptrend line. A sell-stop order is placed at $3.45 but is filled at $3.42 as the market moves quickly lower. Figure 11.10 illustrates this action.

The next day, the market gaps lower. The producer places a limit-price sell order near the bottom of the gap, and hedges an added 15 percent of his expected crop at $3.34 four days later. At this point, 75 percent of the crop is hedged at a weighted average futures price of $3.40 (60 percent at $3.42, 15 percent at $3.34). With an expected harvest-period basis of –$.40, the corn is forward-priced at $3.00.

The downtrend then continues and the producer monitors the situation carefully. The producer can now reasonably expect 85–90 percent of normal yields, perhaps more, and decides to add price protection on another 15 percent of expected production using a put option if an attractive selling opportunity emerges. Watching the chart patterns, the producer decides to add the last increment of protection if a 50 percent correction to the last price high in the bottom of the chart gap develops.

The 50 percent correction does not materialize, but the producer's vigilance is rewarded when a consolidation pattern that looks like a bear flag starts to develop. After about seven trading days, the flag formation is complete. After a close below the flag portion of the formation that has developed near the $3.10 level, a $3.10 December put is purchased at a premium cost of $.15 per bushel. It is now mid-August. Figure 11.11 records the chart patterns and the latest action to buy the $3.10 put.

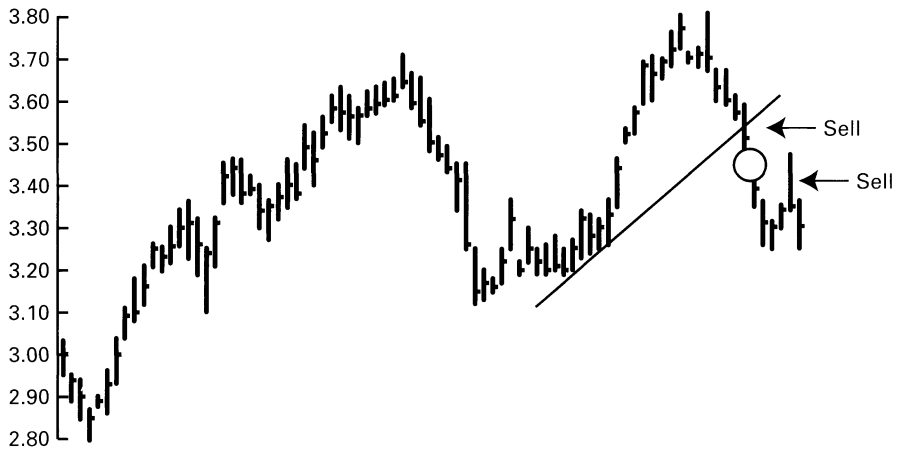

FIGURE 11.10
Replacing Short Hedges on December Corn After a Break of a Trend Line

FIGURE 11.11
Adding Price Protection by Buying a Put Option via Sell Signals on the December Corn Chart

Using the put option on the last 15 percent of the crop reflects an important advantage of options to the producer. If 90 percent of a normal crop were hedged in the futures market, the producer faces potential problems if the August period brings a return to dry and hot weather. A drop in yields below 90 percent of normal would mean any rally in the futures market is not completely covered in the cash market. *Losses in the futures account would then be at least partly out-of-the-pocket losses, not just opportunity costs.* In the event of a partial crop failure, the options have an advantage. Losses in an upward-trending market are restricted to the $.15 option premium. In a higher priced market, the $3.10 put option will be worthless and the producer would just allow the option to expire. This part of the pricing program, you might decide, will not be treated as a selective hedge but as an approach that makes you comfortable with pushing pricing protection up to 90 percent of normal yields.

The downtrend in prices continues. As the market approaches life-of-contract lows at $2.80, you must, as a producer, monitor the situation carefully. Buy orders are placed at $2.81 to lift the hedges for 75 percent of the expected crop in the futures market, and the order is filled. A few days later, however, the market records two consecutive closes below the $2.80 support plane, and the short hedges are replaced at $2.75. Then, two days later, a key-reversal bottom is recorded and the market closes back above the old $2.80 life-of-contract low. On the next day, you have to conjure up the discipline to lift the short hedges again at $2.83. Figure 11.12 highlights the action around the $2.80 support plane during September. The market then works higher as the October *Crop Production* report estimates yields slightly below prereport expectations. No hedges are in place as the crop is sold in late October. The $3.10 put is sold at a premium value of $.20 with the December futures trading at $2.89.

Table 11.5 summarizes the results of the trades during the year. Before commissions and any assessment of interest on margin funds, the trades net $30,300 assuming the normal crop would be 100,000 bushels. That result translates into an improvement of $.303 per bushel when prorated across the entire crop, an improvement of $.404 if prorated across the 75,000 bushels priced in the futures market, or $.337 per bushel when considered across the 90,000 bushels priced either in the futures or in the options.

Clearly, you would have fared well as a producer during this particular year. If the harvest-period basis turns out to be around –$.40, then the cash corn would be

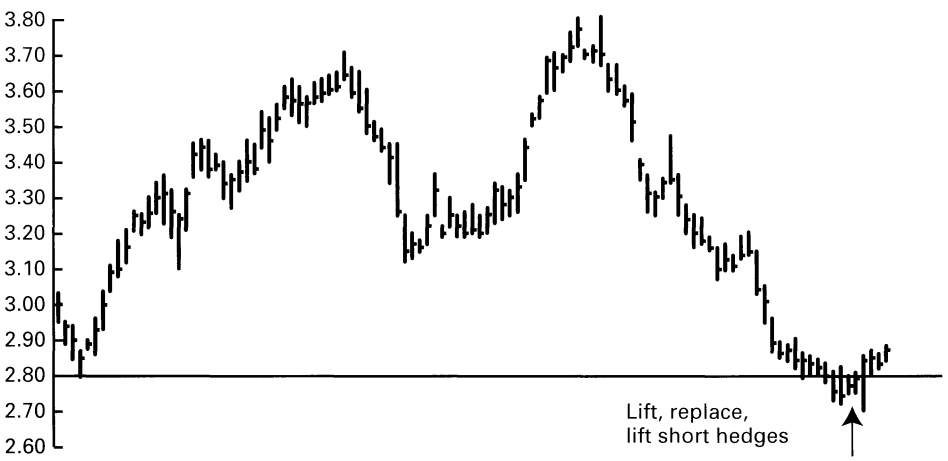

FIGURE 11.12
Actions in a Selective Hedging Program at the Support Plane on the December Corn Chart

sold around $2.50. After allowing for commissions and interest on margin funds, the net from the futures and options program would be nearly $.30 per bushel. Add that to the $2.50 cash market price, and the effective price is $2.80 for a normal crop of 100,000 bushels.

Examined from another viewpoint, the effective or realized price of $2.80 would require a hedge at $3.20 given the –$.40 harvest-period basis expectation. That means any producer following a conservative one-time approach to hedging would have to place the hedge by selling December futures at $3.20. *It is difficult to conceive of a situation in which any conservative producer would have priced 90 percent of expected production at $3.20 or higher.* Producers who are interested in a more flexible posture and willing to be selective hedgers thus have a chance to improve their final positions.

It is important to remember that during some crop years, it would be virtually impossible for a producer following a selective hedging program to improve over a conservative hedge, or to improve the final average price in comparison to a cash market speculative position. *But a better average price is not the only, or even the most important, objective of the selective hedger.* Compared to the cash market speculator, the disciplined selective hedger will have the significant added advantage of being

TABLE 11.5
Summary of Trades During the Year in the Selective Hedging Program

Hedge Placed	Hedge Lifted	Quantity (1,000 bu.)	Net
$3.50	$3.20	30	$9,000
3.29	3.65	50	–18,000
3.42	2.81	60	36,600
3.34	2.81	15	7,950
2.75	2.83	75	–6,000
Put option bought @ $.15, sold @ $.20.		15	750
		TOTAL	$30,300

Net before trading costs for the entire 100,000 bushel crop = $.303 per bushel.

hedged when a sell signal raises the possibility of significantly lower prices. That protection against a ruinous price drop may be worth the possibility of a lower average price during some years when the market trends are not as pronounced and sustained.

You might voice two questions at this point. First, there is the appearance of the transactions being dominated by technical analysis. If that is the case, why worry about the fundamentals? The second question is almost inevitable: Why produce corn? Why not just speculate?

The technical side only appears to be dominating actions of the producers. The technical analysis, after all, generates the timing of actions. The actions and exactly when they are taken get a lot of attention. *But the fundamental side is present.* Decisions on how much to price, how urgent the need for protection is perceived to be, and when you will be willing to tolerate functioning as a cash market speculator are all tied to the fundamental picture. This leads to the oft-repeated conclusion: The two approaches are complementary.

Why not just speculate? First, it is obviously that this individual has chosen to be a farmer and not a commodity speculator. But the issue runs much deeper than that. *It is much easier to be a successful selective hedger in the futures markets than it is to be a successful speculator.* There is a very, very important difference: *The selective hedger has the cash product.* To be successful, the selective hedger must realize profits over time and stabilize revenue flows so that financing needs can be met. Within a 5-year or a 10-year period, the selective hedger can suffer losses in the futures account in an upward-trending market that is difficult to manage. The money in the futures account is lost, but it is matched by gains in the cash market. So, the futures account loss is an opportunity loss, and the business is viable and thriving. Across the same period and in the same markets, the speculator who takes similar positions could go broke. *There is a basic and fundamental difference between selective hedging and speculating.*

The bar chart signals can be effective guides to a selective hedging program for the decision maker with an average financial position, some skill as an analyst, and an ability to manage moderate exposure to risk. When major trends develop, a selective hedging program based on the bar chart signals has the potential to both provide protection and raise the average per-bushel or per-unit return.

Sophisticated Hedging Strategies

In general, the decision maker who is willing to accept more exposure to price risk will be the decision maker who feels comfortable with managing exposure to price risk. Financing must be adequate, of course, if the wide array of available tools are to have a chance of being employed. In many respects, the sophisticated approach will parallel that discussed in the previous section for the more nearly intermediate approaches. Fundamental analysis will still be employed and the bar chart will still be a favorite tool. Option strategies will be employed, but in such a way as to increase the chances of revenue while making a conscious decision on when exposure to price risk will be tolerated.

Fundamental analysis must be completed to establish a price forecast and a probable price range for the year. Techniques were established in the previous section. *The more knowledgeable trader is likely to select the more sophisticated tools such as*

the regression models to forecast prices. Any application of the elasticity framework is likely to also include the capacity to handle the cross-elasticity issues. Analysis of the meat sector, for example, may be conducted at the retail level and then the concept of derived demand employed to generate a price estimate at the live animal level. In the process, price spreads or marketing margins must be analyzed for seasonal or other patterns that would influence what live animal price will be associated with a particular retail price. The analysis is more complex but deals with the issue that prices are set at the consumer level and that most demand analyses are conducted at the retail consumer level.

Table 11.6 provides an example of how the analysis of the hog market might be extended to a more sophisticated plane than that covered earlier in the chapter. Retail pork prices are deflated to remove the influence of changes in the overall price level. The period-to-period change in quantity is either forecasted or estimates of the projected quantity change are pulled from publications such as the USDA's *Livestock, Dairy, and Poultry Situation and Outlook* reports. In Table 11.7, the per-capita supply of pork for the upcoming quarter is projected to be up by 6 percent. Using a retail-level demand elasticity of –0.67, price of pork at retail would be expected to be down 9 percent.

An initial price of pork is estimated and then adjusted for the crossover influence of an expected 5 percent increase in beef prices (cross-elasticity coefficient = 0.35), an expected 8 percent increase in poultry prices (cross-elasticity coefficient = 0.25), and for an expected 1 percent increase in real per capita disposable income (income elasticity coefficient = 0.5). The final price estimate is then inflated by multiplying by the projected level of the consumer price index. The farm–retail price spread is examined across recent years for average, minimum, and maximum levels, and those numbers are used to generate an expected live hog price and a range within which live hog prices might vary.

It is readily apparent that this approach is for the relatively sophisticated decision maker. You are encouraged to spend time on Table 11.6, however. For those who can use this approach, the rewards in terms of quality of the fundamental analysis are apparent. Starting at the retail level and incorporating the demand shifters via the cross-elasticity and income-elasticity measures is a more rigorous approach than just looking at the price impacts of a quantity change at the producer level. The process also focuses attention on variation in the farm–retail price spread as a source of variability in hog prices. For those who might be more comfortable with a more simplistic approach, it is important to understand that many participants in the futures markets do employ fundamental analysis at this level of sophistication or greater. The consensus price being discovered in the futures reflects this effort and analysis.

Given the initial price projections based on fundamental analysis, the decision maker can then proceed to apply numerous technical strategies. Moving averages might be employed, but they are likely to be sophisticated extensions of the moving averages. Bar chart analysis will surely be considered, but in a sophisticated way.

Not all of the strategies will be treated here in great detail. It would be redundant to go through a complete "decision scenario" comparable to that detailed above in dealing with intermediate strategies. Selected extensions will be offered to ensure adequate coverage and to better illustrate the vast array of technical tools from which the decision maker can choose.

The big need insofar as moving averages are concerned is a means of improving the performances of the moving averages in the sideways and choppy markets. The use of penetration rules and/or leading indicators was discussed in Chapter 5, the appendix

TABLE 11.6
Generating an Estimate of Live Hog Prices Based on Retail Prices of Pork

You have:

1. The year-to-year change in per-capita supplies of pork for the upcoming quarter is 0.06;
2. Retail-level demand elasticity for pork is -0.67 and current deflated price is $1.565;
3. Real beef prices are expected to be up 0.05 and cross-elasticity coefficient with pork is .35;
4. Real poultry prices are expected to be up 0.08 and cross-elasticity coefficient with pork is 0.25; and
5. Real per-capita disposable income is expected to be up 0.01 and the income elasticity for pork is 5.

New retail price if only supply changes:

$$-0.67 = \frac{0.06}{X} \quad X = -0.09$$

$$\$1.565 - 0.09\ (1.565) = \$1.424$$

Impact of higher beef prices:

$$0.35 = \frac{X}{0.05} \quad X = 0.0175$$

$$-0.67 = \frac{-0.0175}{X} \quad X = 0.0261$$

$$\$1.424 + .0261\ (1.424) = \$1.461$$

Added impact of higher poultry prices:

$$0.25 = \frac{X}{0.08} \quad X = 0.02$$

$$-0.67 = \frac{-0.02}{X} \quad X = 0.0299$$

$$\$1.461 + 0.0299\ (1.461) = \$1.505$$

Added impact of higher income:

$$0.5 = \frac{X}{0.01} \quad X = 0.005$$

$$-0.67 = \frac{-0.005}{X} \quad X = 0.0075$$

$$\$1.505 + 0.0075\ (1.505) = \$1.516$$

Once the per-capita supplies are projected and "fixed" at 1.06 of the previous year, then the influence of demand shifters such as the projected change in beef prices must be converted to price implications *at a fixed quantity of pork.* Therefore, the impact of a 0.05 projected increase in beef prices is carried back through the demand-elasticity framework for pork. The *inability* to take a 0.0175 increase in pork supplies is converted, via the cross-elasticity framework, to a 0.0261 increase in pork prices. Comparable adjustments are made for the impact of the higher poultry prices and the increase in income.

To inflate:

$1.516 (1.569) = $2.378
where the 1.569 reflects a CPI (198284 = 100) estimate for the upcoming quarter.

To convert to live-hog price at the farm level:

Retail price – (farm to retail price spread) = net farm value
$2.378 – 1.630 (average spread) = $.748

Net farm value ÷ 1.6 = *live hog price*
$.748 ÷ 1.6 = $.4675 or $46.75 per hundredweight

The average projected quarterly price is therefore $46.75. If the range in the farm–retail spread across recent quarters has been 1.598 to 1.712, the range in projected hog prices would be

($2.378 – 1.598) ÷ 1.6 = $46.87
($2.378 – 1.712) ÷ 1.6 = $41.62

The price range is $41.62 to $46.87, and this demonstrates the importance of the magnitude of the farm-retail price spread as one of the major contributors to change in farm-level hog prices.

to Chapter 5, and again in Chapter 6 on the psychology of the market. In that discussion, selected prices of research were referenced. The work by Riffe and Purcell referenced in this chapter used a 3-day moving average to confirm the signals of the 5- and 15-day combinations for cattle feeders. The leading average reduced the number of trades and increased the net per trade.

Many analysts have adapted measures of market volatility and market oscillators from the developments by Wilder. Conceptually, the idea is to use a measure of volatility to determine whether the trader should be using moving averages or whether they should go to some other approach. In choppy and sideways markets, the level of volatility is high, and moving averages will not be the best choice for a selective hedging program. A major book by Wilder was mentioned in Chapter 4 and is listed in the references at the end of that chapter. The reader interested in this type of system is encouraged to take a look at the book. It is one of the best references on advanced technical trading systems currently available. The book by Schwager is also excellent, is relatively new, and covers a broad array of the technical tools used in the markets.

In discussing the intermediate-level strategies, the use of market corrections was demonstrated. The more sophisticated trader would use the concept of a correction, but might reinforce that approach via familiarity with the Elliott wave theory. Entire books have been written on this approach and references are shown at the end of the chapter. Knowledge of the tendency for bull markets to come in five waves with waves 2 and 4 the correction waves can be important to the decision maker. In bear markets, there tends to be three waves with wave 2 the corrective wave for wave 1. Some analysts have developed projection techniques using the length of the moves in the developing market moves.

The December 1997 soybean oil chart shown in Figure 11.13 demonstrates. A soybean producer who is still a cash market speculator and who is waiting to set price protection on stored soybeans would feel more comfortable after examining the oil chart. The first rally that developed in September appears to be wave 1. The corrective wave 2 lasted into early October, followed by wave 3 to the upside during the month of October. The brief correction that followed would be the corrective wave 4, and the last thrust on the price chart would then be wave 5. *Given this interpretation, the producer will expect topping action to start soon. The five-wave bull market may be over. If the soybean oil futures top, then the soybeans might top too—and the producer is more vigilant in watching for pricing opportunities in soybeans.*

All this is not as easy as it might appear on an *ex post* basis. As the "waves" develop, it is sometimes very difficult to separate moves within a wave from the moves that will ultimately be the primary market waves. Experience and sophistication as a market analyst are needed here.

Sophisticated applications of options continue to emerge as users probe possibilities and adapt the relatively new tools to their needs. In the context of a relatively sophisticated and well-financed decision maker who is willing to accept and manage exposure to price risk, the option strategies selected will typically be strategies that allow controlled or managed exposure to price risk in order to open up the possibility of a larger return. A demonstration of such strategies was offered in Chapter 7.

The importance of effective fundamental analysis is especially apparent here. If the decision maker is to deliberately accept exposure to the risk of lower prices or to the risk of higher costs of inputs in order to open up the possibility of better prices or lower costs across selected price ranges, then *there has to be a degree of confidence in the analysis of expected price patterns.* Technical analysis can help, of course. Assume, for example, that fundamental-based pricing models suggest that the prices

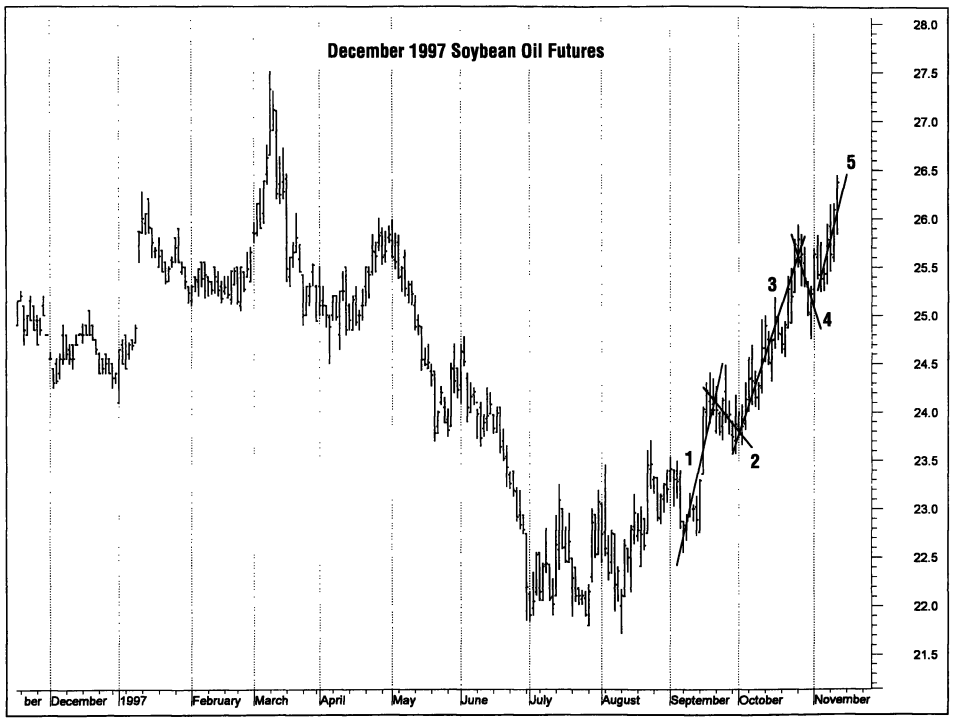

FIGURE 11.13
A Possible Five-Wave Bull Market on the December 1997 Soybean Oil Futures Chart

of corn, soybeans, wheat, cattle, or hogs are likely to trend higher. If the fundamental analysis is calling for higher priced soybeans, for example, support comes from the technical dimensions of the market if the new crop of November soybeans is near the contract low with the RSI showing the market to be approaching an oversold status. Under such circumstances, the producer might seek to protect against falling prices while leaving open the potential of higher prices, and would tend to use options. But the more sophisticated user might also prefer a better net price than is available from the simple buying of a put option.

Table 11.7 provides an example that provides a higher price floor for soybeans than just buying a put option and leaves open the potential of higher prices. In the illustration, the cash futures basis is assumed to be zero for ease of exposition.

The numbers in the body of the table are the net prices for the various strategies (down the left side) given various closing prices for the November futures (across the top). For example, the "Buy $7.50 put" strategy yields a net of $8.02 per bushel when the November futures are at $8.50 at the end of the production period. It is apparent that strategies 3 and 4 will be superior *if the price trend is up.* If the market drops, protection is less effective than it would be by just buying the put option. The risk exposure is substantial for strategies 3 and 4 and net prices are worse than being a cash market speculator at significantly lower prices.[9] *Such strategies place emphasis*

[9]To illustrate for strategy 4, when November futures go to $7.00, selling a $7.50 put generates revenue of $.48, but is now losing $.50. Before commissions, the net is –$.02 per bushel. Buying an $8.00 call involves an outlay of $.39 in option premiums, and the $8.00 call is worthless with the market at $7.00. Therefore, the options strategies show a net –$.41 (–$.02 and –$.39), and the net price is the $7.00 cash less $.41 or $6.59.

TABLE 11.7
Net Prices for Straight Hedge and Alternative Option Strategies in a Soybean Market Expected to Trend Higher: Expected Basis = 0

Strategy	Closing Price November Futures						
	$6.50	**$7.00**	**$7.50**	**$8.00**	**$8.50**	**$9.00**	**$9.50**
1. Sell November futures @ $7.50.	7.50	7.50	7.50	7.50	7.50	7.50	7.50
2. Buy $7.50 put.	7.02	7.02	7.02	7.52	8.02	8.52	9.02
3. Sell $8.00 put.	5.80	6.80	7.80	8.80	9.30	9.80	10.30
4. Sell $7.50 put, buy $8.00 call.	5.59	6.59	7.59	8.09	9.09	10.09	11.09

Closing price November futures = $7.57.
Option premiums are as follows:

Strike Price	Puts	Calls
$7.00	$.25	$.84
7.25	.35	.69
7.50	.48	.57
7.75	.62	.48
8.00	.80	.39
8.25	.97	.32

If the expected cash futures basis were −$.50, the "nets" in the table would all be $.50 lower, but the comparisons of the strategies would not be affected.

on fundamental analysis, and should be employed—even by the sophisticated user—only when there is a reasonable degree of confidence that the price trend will be up.

The oft-repeated need for a well-defined plan of action is relevant here. If the supply–demand balance starts to change to the bearish side, adjustments may be needed. Both strategies 3 and 4 involve selling put options, and those positions must be covered if lower prices loom imminent. *The contingency plan should be prepared in advance.*

At many points in the book, it has been assumed that you can convert the reasoning behind the development of a short hedge strategy to a long hedge strategy. But that assumption might not always be correct, and that is especially the case with a sophisticated option strategy. Table 11.8 records the actions taken and Figure 11.14 pictures the performance of a mixed trade strategy relative to simply buying a call option to protect against higher corn costs. Note that the more sophisticated strategy (strategy 3) will be effective if the price of corn is in the projected price range. If prices move out of the range to the high side, the corn user is exposed to the risks associated with higher costs.[10] *The ability to predict the direction of price movement and a price range using fundamental and/or technical analysis is again very important to the success of the strategy, and such a strategy should be employed only when there is a high degree of confidence in that analysis.*

[10]If futures prices go to $3.50, to illustrate, the net cost of the corn will be $3.55. Selling the $2.50 put gives premium revenue of $.08. Selling the $3.00 call yields a premium revenue of $.17, but that position is losing $.50 when futures are at $3.50 for a net of −.33. The net cost before commissions would be $3.55, well above the strategy of buying a $2.70 call that places a cost ceiling at $2.67. At higher prices, the net from the mixed options strategy yields a higher cost than would be yielded by being a cash market speculator.

Situation: (1) December corn futures @ $2.73
(2) Option premiums are as follows:

Strike Price	Puts	Calls
$2.50	$.08	$.37
2.60	.14	.34
2.70	.23	.27
2.80	.27	.23
2.90	.35	.20
3.00	.42	.17

(3) Harvest period basis projected to be –$.30

Strategies: 1. Buy in cash market.
2. Buy $2.70 call.
3. Sell $2.50 put, sell $3.00 call.

TABLE 11.8
Demonstration of Option Strategies to Place a Ceiling on Feed Costs

In some instances, there may be no strong evidence that the price will trend in either direction. In this setting, the more sophisticated decision maker might be interested in accepting the risk associated with a move outside a price range. Table 11.9 demonstrates for hogs. For prices above $60, the producer is willing to carry the opportunity costs associated with higher prices. Selling the call option prevents benefits of cash prices above $60. For prices below $50, the producer is exposed to the problems associated with lower prices. *The producer feels comfortable with his ability to predict that prices will vary within a $10 range between $50 and $60, and he seeks improved returns from the adopted strategies within that price range.* Figure 11.15 demonstrates performance of the mixed option strategy relative to simply selling the futures. As long as prices stay above $48.10, the mixed options strategy of selling a $60.00 call and a $50.00 put yields a superior return to the cash market. Above $53.10, the mixed options strategy is superior to selling the futures at $55.00. Obviously, the returns to the strategy will improve if the price range can be narrowed. If added analysis indicates prices are likely to stay in a $52.00 to $58.00 range, selling

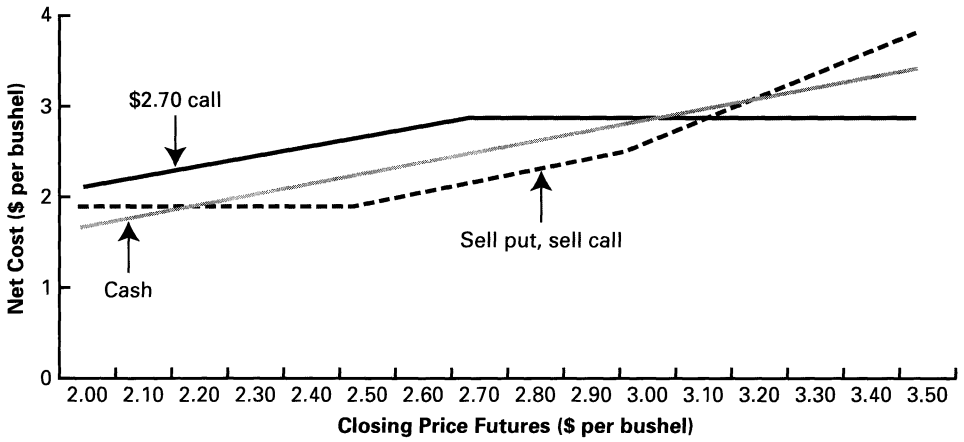

FIGURE 11.14
Comparison of Buying in Cash, a Call Option, and a Mixed Option Strategy: Corn Costs

TABLE 11.9
Demonstration of an Options-Based Strategy Designed to Yield Superior Returns to a Hog Operation in a Specific Price Range

Situation: (1) December Hog Futures @ $55.00.
(2) Option Premiums are as follows:

Strike Price	Puts	Calls
50	$ .90	$5.10
52	1.45	4.10
54	2.25	3.25
56	3.25	2.30
58	4.65	1.65
60	5.50	1.00

(3) Expected cash futures basis when hogs are sold is zero.

	Closing Price December Futures							
Strategy	**$48**	**$50**	**$52**	**$54**	**$56**	**$58**	**$60**	**$62**
1. Sell December futures @ $55.00.	55	55	55	55	55	55	55	55
2. Sell $60.00 call; sell $50.00 put.	47.90	51.90	53.90	55.90	57.90	59.90	61.90	61.90

the $52.00 put and the $58.00 call will increase the net by $3.10 ($1.45 from selling the $52.00 put plus $1.65 from selling the $58.00 call) compared to the cash market.

Consistent with the more sophisticated strategies, there must be a plan to protect the program if the analysis turns out to be wrong. Let's assume a hog producer adopts a strategy of selling the $52.00 put and selling the $58.00 call. These actions would contribute $3.10 per hundredweight in premium revenue before commissions.

The need for a contingency plan is apparent if we assume the market gets shocked with a *Hogs and Pigs* report that is unexpectedly bearish. The futures market starts to move lower and there is a very real possibility that the $52.00 level, the bottom end of the price range, will be taken out. Below $52.00, the producer is facing both a declining cash market and the exposure of having sold the $52.00 put. *The risk exposure is twice that of a cash market speculator.*

One straightforward approach is to buy the $52.00 put back. The premium will be increasing as the market moves lower, but the producer has the $3.10 with which to work. In a declining market, the $1.65 revenue from selling the $58.00 call should be secure.

If the outlook has deteriorated significantly, the producer might opt to buy back the $52 put and buy a $50 put to protect against a major drop in price. Alternatively, two $52 puts could be bought. Buying two would offset the previous sell of the $52 put and provide a net position of a $52 put to protect against lower prices.

Numerous plans can be followed which will be appropriate will depend on the emerging price outlook and the probability that prices will go sharply lower. *As a producer, you will have to update fundamental analyses and keep a close eye on the technical dimensions of the charts.* With $3.10 per hundredweight in revenue with which to work, a number of possibilities would generate a net better than buying a $52.00 put or a straight hedge at $52.00. Since extremely sharp price declines are the unexpected scenario, the results in most of the instances would be better than the straight hedge.

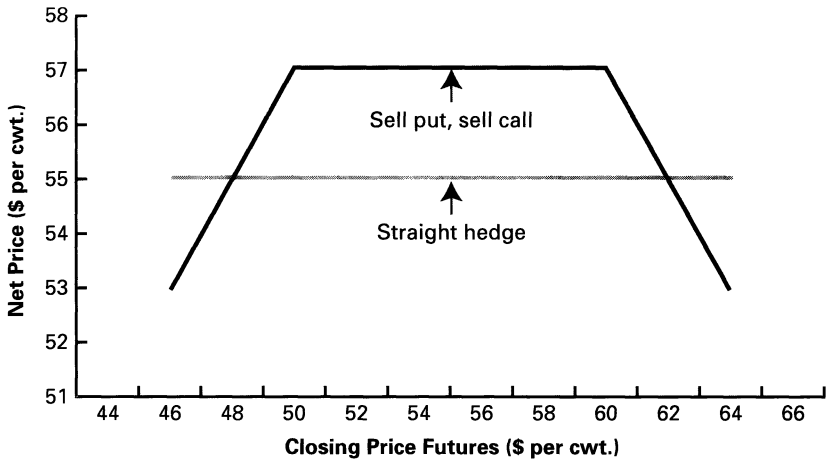

FIGURE 11.15
Comparison of a Straight Hedge and Options Strategies: Hog Prices

The more sophisticated strategies will tend to be selected by decision makers with above-average analytical skills, the financial prowess to use any strategy, and the orientation toward accepting some price risk when the potential reward is significant. These strategies will involve the sophisticated approaches to technical analysis and will often involve options strategies that deliberately leave open exposure to cash price risk in price ranges that are outside the expected or projected price range.

HEDGING STRATEGIES IN PERSPECTIVE

Strategies in this chapter and throughout the book have been developed with an eye toward effectiveness. That is, developments have been oriented toward strategies that not only reduce the variability of revenue flows but also raise their average level. That is the motivation behind selective hedging and behind the attention to fundamental analysis to help the decision maker decide when the role of cash market speculator is the correct role.

It would be inappropriate to imply, however, that you will have to be able to forecast prices accurately and be excellent at reading the charts before hedging will work. Numerous studies have confirmed that hedging on a routine basis or hedging using a simple indicator will in fact significantly reduce the variability of revenue flows and, in some instances, raise the average level of the revenue flow. A study by Schroeder and Hayenga, listed in the references at the end of the chapter, found that a strategy of hedging cattle in the feedlot whenever a $4-per-hundredweight margin was offered was very effective. *Developments in this chapter accept the fact that use of the futures and options can help and attempts to move you toward even more effective strategies.*

It is appropriate to remind you once again that the tax implications of strategies that involve selling call or put options have not always been completely clear. Prior to a Treasury Department administration action in the summer of 1994, losses incurred due to selling a call, for example, were usually treated as speculative losses. Selling a call above the market and buying a put below the market, the "fence" in Chapter 7, *appears* to be okay in light of the Treasury Department action. *It is not clear in late*

1997 that selling a put will not be treated as speculative activity by the IRS, however. Such a possibility should be considered when contemplating strategies such as those developed in this chapter. Talk to your tax accountant. We will all need to monitor developments and look for clarifications in this area because some of these strategies have tremendous potential.

SUMMARY

The proper strategy for a decision maker to employ in managing exposure to price risk will depend on the producer's *attitude toward risk, the financial capacity* to carry risk, and the *abilities of the decision maker* as a market analyst. Given an assessment of those characteristics, there is a wide array of strategies from which any decision maker may choose.

Both fundamental and technical analysis will prove to be important. Early in the relevant decision period, it will be important to project the price level for the period and the range within which the price is likely to vary. *Fundamental analysis is essential.* The choice of strategies will be influenced by the expected amplitude of price swings and the likelihood of major price trends.

More conservative hedging strategies, such as *target price hedging,* need a backup strategy in the event the target price is never offered. A mechanical system such as *moving averages* has potential to protect against a ruinous price dip. Out-of-the-money *put options* can be used to provide a price floor in some circumstances.

Decision makers with a better financial position and who can accept and manage some exposure to price risk will tend to select strategies designed to improve net returns compared to a conservative hedging approach. A selective hedging strategy can be based on *moving averages* or it can be managed using widely recognized *bar chart patterns.*

Strategies based on *options* can allow the decision maker to *choose price ranges* within which exposure to risk will be accepted in *search of a higher price floor* or net return within the expected price range.

The more sophisticated strategies should be based on *more sophisticated efforts in fundamental analysis.* The capacity to *anticipate price direction* and to *identify a price range within which price is likely to remain* is closely related to fundamental analysis and can be reinforced by such technical dimensions as the life-of-contract trading range.

KEY POINTS

- It is important that decision makers select a strategy consistent with their *attitude toward risk, the financial capacity* to carry exposure to price risk, and their ability to *manage exposure to price risk effectively.*
- *Conservative strategies* that involve a one-time placing of a hedge need a *safety net* to block potentially ruinous price moves in the event target price objectives are not offered by the markets.
- Selective hedging strategies have the potential to *decrease exposure to price risk* and to *increase the net returns,* but such a set of outcomes will not always be possible. The main objective is to *decrease exposure to price risk,* and strategies should be employed with that objective in mind.

- More sophisticated strategies that are designed to provide protection over specific price ranges require effective *fundamental and technical analysis. Fundamental analysis* is especially important to guide selection of strategies that work best for a *certain direction of price trend* or are effective *within a selected price range.*
- The relatively new options may be the most important tool for the capable manager who seeks returns above a straight hedge and *who is willing to accept exposure to price risk within a certain price range. Net prices or net costs* for mixed option strategies can be superior to *straight hedges* or direct use of *put and call options* if the probable price range can be predicted with confidence.

USEFUL REFERENCES

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