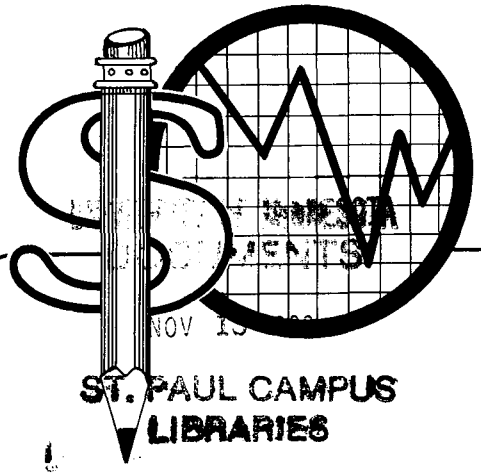

Cross Hedging Agricultural Commodities

Producer Marketing Management Fact Sheet #12

By Ted C. Schroeder, Department of Agricultural Economics, Kansas State University

Reviewed by Hugh J. McDonald, extension grain marketing economist, North Dakota State University, and Stanley C. Stevens, extension economist, marketing, University of Minnesota

Executive Summary

Cross hedging is hedging a commodity in the futures market of a different commodity. This fact sheet introduces the concept of cross hedging of agricultural commodities. It explains what a hedge ratio is and goes into depth interpreting the expected risks associated with cross hedging.

In general, cross hedging will likely work well if: 1) the price of the commodity being cross hedged and the price of the futures commodity are closely related and follow one another in a predictable manner, 2) combined basis and hedge ratio variation is less than unhedged price risk, or 3) the producer has large enough production to meet cross hedged futures contract size specifications. Cross hedging will not work well if: 1) the price of the cash commodity does not follow the futures market price in a predictable manner, or 2) combined basis and hedge ratio risk are greater than unhedged price risk.

In order to determine the feasibility and expected performance of cross hedging a given commodity, the producer needs to investigate the historical relationship between the local cash commodity's price and the futures price. This requires collection and analysis of historical cash and futures prices. A cross hedge should be considered only after comparisons of the *local* cash prices to the relevant futures prices and an analysis of the expected risks of remaining unhedged or forward contracting versus cross hedging.

Agricultural producers need to be aware of and understand the alternative markets and marketing techniques available to help them reduce price risks. Producers have a variety of pricing alternatives available including cash marketing, forward pricing, hedging, options, and deferred pricing. However, many agricultural commodities do not have futures and options markets. For example, grain sorghum producers do not have access to a grain sorghum futures market in which to hedge. Similarly, no futures markets exist for many classes of livestock, such as feeder pigs or slaughter lambs. To the extent forward markets are available for producers of these commodities, forward markets can be used to lock in future prices. However, the producers of many of these commodities are not necessarily "out in the cold" regarding futures and options markets. As a substitute, they can use the futures markets of commodities that have predictable price relationships with the commodity being marketed.

Hedging a commodity in the futures market of another commodity is referred to as cross hedging. Using cross hedging successfully requires determining the size of futures position to take and

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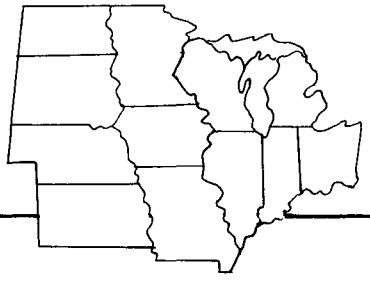


deciding which futures contract to use for cross hedging to minimize the price risk for a given quantity of the cash commodity.

The purposes of this fact sheet are: a) to introduce the concept of cross hedging, b) to present some examples of markets which can be used to cross hedge specific commodities, and c) to recommend strategies for cross hedgers. Cross hedging techniques for selected commodities, including grain sorghum, barley, sunflower seeds, feeder pigs, and lambs, will be addressed. The techniques discussed are applicable to long hedgers (trying to reduce input price risks) as well as short hedgers (trying to set selling prices). Additionally, the principles discussed can be applied to marketing strategies involving either hedges or options on futures markets. It is assumed that readers are familiar with the terms, methods, and techniques used in hedging. More information on the basics of hedging, options, and basis relationships is contained in North Central Regional Extension Publication 217, Fact Sheets #1 (options), #5 (livestock basis), and #8 (grain basis).

Cross Hedging Issues

Two issues must be addressed when deciding to cross hedge a commodity in a futures market of another commodity. First, one needs to determine the futures contract (if any) in which to cross hedge the commodity. For example, to cross hedge grain sorghum should one use oats, corn, soybeans, wheat, or some other futures contract?

In general the contract to use is the one whose price has a fairly predictable relationship with the price of the commodity being hedged. For example, the corn futures contract is the most likely choice for cross hedging grain sorghum because milo prices should follow corn prices closely as they are close substitutes in feed rations. Moreover, grain sorghum prices will likely be forced to follow corn prices fairly predictably through market arbitrage (individuals purchasing the underpriced commodity or selling the overpriced commodity, thus driving the two prices toward a stable price relationship based on the relative values of the commodities). Similarly, when cross hedging feeder pigs a likely market to consider would be the live (slaughter) hog futures contract. Feeder pig prices should have a fairly predictable relationship with live hog futures prices because as slaughter hog price expectations increase (decrease) feeder pig producers will be willing to pay higher (lower) prices for feeder pigs, assuming no changes in other costs. However, determining which contract to use when cross hedging a specific commodity is not always obvious and may require some analyses comparing the relative price patterns of several different futures contracts. For example, it is not obvious whether cash slaughter lamb prices will follow live hog or live cattle futures prices more closely.

Once the appropriate futures contract has been determined, the hedger needs to know the size of futures position to take. For example, when hedging corn in corn futures, the general recommendation is to hedge one 5,000 bushel contract for each 5,000 bushels of corn

one wants to protect. However, when cross hedging grain sorghum in corn futures, one should not assume the same one-to-one relationship will be the preferred futures-to-cash hedge ratio. It may be advantageous to take a larger or smaller position in the futures market than the cash market position one is trying to hedge. The following discussion focuses on determining the size of futures position to take.

Determining the Net Localized Price

When evaluating whether or not to place a hedge, a producer must have an idea of the expected net localized price of the commodity being considered. In typical hedges (e.g., corn in corn futures), calculating the expected net localized price is a relatively simple process and involves adding the basis (cash price minus futures price) to the futures price and adding hedging costs for a long hedger or subtracting hedging costs for a short hedger. The following formula can be used to calculate the expected net localized price:

(1) Futures price
+ Expected basis
+/- Hedging Costs
= Expected net localized price

In cross hedging, this formula must be modified when the futures market position is not equal to the quantity in the cash market. In this case, the expected net localized (cross hedgeable) price can be calculated using the following formula:

(2) b (Futures price)
+ Expected basis
+/- Hedging Costs
= Expected net localized price

In this formula the futures price must be weighted (multiplied) by "b" which is referred to as the "hedge ratio." The hedge ratio is the futures market quantity divided by the cash market quantity. The hedge ratio is an estimate of the relative price change between the futures market and the cash market. For example, a hedge ratio of 1.0 implies that for every $1/unit change in the futures price, the cash price of the commodity being hedged will change by an equal $1/unit in the same direction. A hedge ratio of 1.5 would imply that for each $1/unit change in the futures price the cash price of the commodity being hedged changes by $1.50/unit. And a hedge ratio of 0.8 would imply that for each $1/unit change in the futures price the cash commodity's price would change by $.80/unit.

The expected basis in this case is the expected difference between the weighted futures price and the cash price of the cash commodity (cash price minus weighted futures price = basis) at the time and location the cash transaction (buy, for a long hedger, or sell, for a short hedger) will be completed and the hedge lifted. Different commodities will have different hedge ratios and different expected basis levels. In addition, because seasonal differences may exist between the futures price of one commodity and the cash price of another commodity, the hedge ratio and expected basis will likely vary for different contract months.

Finally, a given commodity will have location-specific hedge ratios and basis patterns. That is, grain sorghum at Kansas City will not have the same hedge ratio and basis behavior as grain sorghum at Amarillo or at

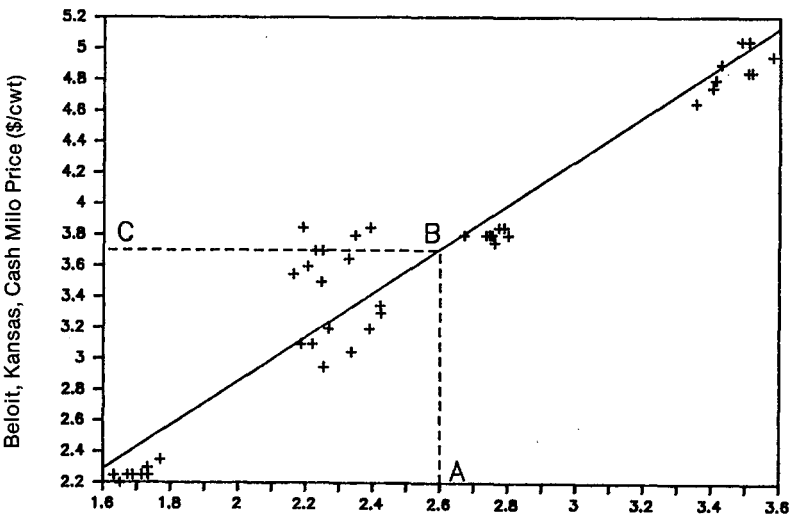
Peoria because the local supply and demand conditions are different.

The hedge ratio and expected basis are determined by estimating the relationship between the futures price and the cash price of the commodity being hedged in the following equation:

Cash Price = a + b (Futures Price)

where an estimate of "b" is the hedge ratio and an estimate of "a" is the expected basis. One rough way to estimate this relationship is to graph the cash price of the commodity to be cross hedged as a function of the nearby futures price over a period of years. For example, if one were planning to sell milo in October or November and wanted to cross hedge it in the December corn futures, one could plot the local market weekly cash milo price during October and November against the weekly December corn futures price in October and November for a number of years, and fit a rough line to the data. The graph could be used directly to determine the expected net localized price and the hedge ratio.

Figure 1 illustrates such a graph. Wednesday cash milo prices for Beloit, Kansas, were collected and plotted against Wednesday closing December corn futures prices during October and November of 1982 through 1986. A "rough" line was then drawn through these plotted points. The graph can be used to determine an expected net localized price from hedging by starting at the quoted December corn futures price (on the day the cross hedge would be placed) on the horizontal axis and going up to the fitted line. The corresponding localized milo price is found on the vertical axis. For example, if the December corn futures price was $2.60/bu (point A) in July, the corresponding expected net localized October-November cash milo price would be $3.70/cwt (point C) less any brokerage commissions and interest on margin.



" + " represents the actual observed prices

Figure 1. Plot of Beloit, Kansas, Wednesday Cash Milo Price against Wednesday, Closing December Corn Futures Price during October and November, 1982 through 1986.

The hedge ratio is the slope of the rough line, or in the example chosen, the hedge ratio is about 1.40. The graph indicates that for every $1/bu increase in the December corn futures price the October–November Beloit, Kansas, cash milo price increases by $1.40/cwt (e.g., as corn futures went from $2/bu to $3/bu, the cash milo price went from $2.80/cwt to $4.20/cwt). One now has all the information needed to calculate the expected basis. That is, the expected basis, "a" = cash price - 1.4 (futures price). The more dispersed the observed price relationships are (i.e., they do not follow a straight line), the more risk the cross hedger faces that the expected and actual net hedged prices will not be the same.

This method of estimating the hedge ratio and expected basis is *rough* and is provided merely to illustrate the hedge ratio. This process generally will not give one the least risky hedge ratio, and particularly because it will depend on the slope of subjective line chosen, one will never get a perfect fit. In addition, little information is provided in the graph alone, aside from how closely the data fit the line, about the risks associated with cross hedging the specific commodities being considered. It is recommended that those considering cross hedging use some type of computer software to help estimate the expected risks associated with cross hedging. The discussion in the remainder of this fact sheet is based on hedge ratio relationships estimated using computer software to statistically estimate the hedge ratio and associated risks, to enhance the simple graphical approach just described.

The next section discusses how one can interpret and use the hedge ratio and the estimated basis in a cross hedging program. Also, the risks associated with cross hedging are identified. It is strongly urged that the particular risks be considered by the cross hedger prior to placing a hedge.

Cross Hedging Selected Grains

A logical market in which to cross hedge most feed grains (which are substitutes for corn) is the corn futures market. Table 1 contains estimated hedge ratios for Kansas City grain sorghum and Duluth feed barley in corn futures. Similarly, oil seed and protein meal crops would be expected to be most closely related to the soybean complex futures markets. Table 2 provides similar information for cross hedging Duluth sunflower seeds in the soybean oil futures market. The tables have the information needed to determine the net expected localized price if a cross hedge were placed. They also contain information on the degree of basis risk and hedge ratio risk one could expect to encounter in the specific local markets used as examples.

A brief summary of the items reported in Table 1 is provided to aid their interpretations. The other tables can be interpreted in a similar fashion. Column (1) of Table 1 contains the respective corn futures contract months. A hedger should generally hedge in the contract month which most closely matches but does not expire prior to the expected date of the cash transaction. The numbers associated with each respective futures contract month are estimated using data from the date of expiration of the

Table 1: Estimated hedge ratios, expected basis, and cross hedging price risk for Kansas City grain sorghum and Duluth feed barley in corn futures 1976-86.[a]

	(1) Corn Futures Contract	(2) Expected Basis	(3) Basis Variation	(4) Hedge Ratio	(5) Hedge Ratio Variation	(6)[b] Quantity of Cash Commodity per 5,000 bu Corn Futures Contract	(7) Combined Basis & Hedge Ratio Variation
K.C. Sorghum		($/cwt)	($/cwt)	(bu/cwt)[c]	(bu/cwt)	(cwt)	($/cwt)
	MAR	+0.25	0.13	1.50	0.05	3,333	0.22
	MAY	+0.38	0.19	1.45	0.07	3,448	0.26
	JUL	+0.04	0.21	1.57	0.07	3,185	0.28
	SEP	+0.13	0.13	1.55	0.05	3,226	0.26
	DEC	+0.26	0.10	1.47	0.04	3,401	0.24
Duluth Barley		($/bu)	($/bu)	(bu/bu)[d]	(bu)	($/bu)	
	MAR	-0.18	0.13	0.82	0.05	6,098	0.21
	MAY	+0.31	0.10	0.63	0.07	7,937	0.26
	JUL	+0.17	0.19	0.67	0.07	7,463	0.25
	SEP	+0.28	0.09	0.64	0.03	7,813	0.19
	DEC	+0.24	0.09	0.69	0.03	7,246	0.22

a) Wednesday, Kansas City grain sorghum prices, Thursday, Duluth barley prices, and corresponding Chicago Board of Trade corn futures prices.
b) 5,000 bu. per contract divided by column (4).
c) Bushels of corn futures per cwt of milo to achieve comparable value.
d) Bushels of corn futures per bushel of barley to achieve comparable value.

Table 2: Estimated hedge ratio, expected basis, and cross hedging price risk for Duluth sunflower seed in December soybean oil futures 1976-86.[a]

(1) Soybean Oil Futures Contract	(2) Expected Basis	(3) Basis Variation	(4) Hedge Ratio	(5) Hedge Ratio Variation	(6)[b] Quantity of Cash Commodity Per 60,000 lb. Soybean Oil Futures Contract	(7) Combined Basis & Hedge Ratio Variation
	($/cwt)	($/cwt)	(cwt/cwt)[c]	(cwt/cwt)	(cwt)	($/cwt)
DEC	-3.62	0.80	0.31	0.03	1,935	$1.34

a) Thursday, Duluth sunflower seed prices and Chicago Board of Trade soybean oil futures prices.
b) Hundred weights of soybean oil per cwt of sunflower seeds to achieve comparable value.
c) 600 cwt per contract divided by column (4).

Table 3: Estimated hedge ratios, expected basis, and cross hedging price risk for Kalona-Knoxville, Iowa, feeder pigs in live hog futures 1976-86.[a]

(1) Live Hog Futures Contract	(2) Expected Basis	(3) Basis Variation	(4) Hedge Ratio	(5) Hedge Ratio Variation	(6) Quantity of Cash Commodity Per 30,000 lb Hog Futures Contract	(7) Combined Basis & Hedge Ratio Variation
	($/hd)	($/hd)	(cwt/hd)[b]	(cwt/hd)	(head)[c]	($/hd)
FEB	-14.21	4.12	1.04	0.08	288	4.51
APR	- 3.52	2.96	1.04	0.07	288	3.62
JUN	-16.78	2.79	1.17	0.06	256	3.58
JUL	-24.24	6.87	1.23	0.14	244	5.65
AUG	-24.86	5.99	1.25	0.12	240	6.12
OCT	-24.92	3.96	1.37	0.08	219	5.79
DEC	-29.66	6.74	1.39	0.14	216	5.17

a) Kalona-Knoxville, Iowa, auction market 40 lb average weekly average feeder pig price.
b) Hundred weight of hog futures per feeder pig to achieve comparable value.
c) Average weight of 40 lbs per pig.

Table 4: Estimated hedge ratios, expected basis, and cross hedging price risk for Sioux Falls, South Dakota, slaughter lambs in live cattle futures 1976-86.[a]

(1) Cattle Futures Contract	(2) Expected Basis	(3) Basis Variation	(4) Hedge Ratio	(5) Hedge Ratio Variation	(6) Quantity of Cash Commodity per 40,000 lb Cattle Futures Contract	(7) Combined Basis & Hedge Ratio Variation
	($/cwt)	($/cwt)	(cwt/cwt)[b]	(cwt/cwt)	(cwt)[c]	($/cwt)
FEB	+41.37	4.51	0.30	0.08	1,333	7.92
APR	+41.29	3.17	0.33	0.05	1,212	5.62
JUN	+51.99	4.65	0.23	0.08	1,739	6.77
AUG	+32.74	4.20	0.46	0.07	870	6.94
OCT	+24.30	4.31	0.57	0.07	702	6.96
DEC	+26.56	6.89	0.52	0.12	769	6.96

a) Sioux Falls, South Dakota, weekly average slaughter lamb prices.
b) Hundred weight of cattle futures per cwt of lambs to achieve comparable value.
c) 400 cwt per contract divided by column (4).

previous contract to the 15th day of the contract month being considered, e.g., the MAY corn relationship includes data from late March through May 15. Column (2) contains the typical weighted basis relationship (defined as the price of the cash commodity minus the hedge ratio-weighted futures price) which existed over the 1976-1986 period from the expiration date of the previous contract month to the 15th day of the nearby contract month. For example, the $0.38/cwt basis for grain sorghum in May corn futures is the average weekly basis over the 1976-1986 period during late March (time of MAR contract expiration) through May 15 (just prior to the May contract expiration). Column (3) is the basis variation which provides a measure of the basis risk. The amount of basis risk is measured by variability in the basis over the 1976-1986 period for each respective hedging relationship. The greater the basis variation, the more basis risk that is present. A general rule of thumb is that approximately two-thirds of the time the ending basis will not be above or below the expected basis by more than the basis variation reported, and about 95 percent of the time the actual basis should be within plus or minus two times the variation of the expected basis. A similar interpretation applies to the hedge ratio variation.

Column (4) contains the hedge ratio, explained in the previous section. The variation of the hedge ratio is reported in column (5) and has a similar interpretation to the basis variation; two-thirds of the time the hedge ratio should be within plus or minus the hedge ratio variation. The futures position divided by the hedge ratio gives the amount of cash commodity hedged in column (6). Column (7) is the combined basis and hedge ratio variation in the cash and futures price relationship, which provides a measure of combined basis and hedge ratio risk associated with cross hedging. Approximately two-thirds of the time the net hedged price should not be any greater or smaller than the expected net localized price plus or minus the combined variation. The following examples should help clarify how a producer can use the information in the tables to investigate cross hedging opportunities.

Examples

1. Grain Sorghum Purchaser. Suppose a cattle feeder in east-central Kansas wants to hedge the price of grain sorghum in December for anticipated feed requirements to be purchased in April and early May. The first step is to calculate the equivalent expected sorghum price the May corn futures market is offering. To determine this, one needs to calculate the expected net localized price. Assuming that the May contract corn futures price is $2.10/bu, the calculation of the expected net localized (cross hedgeable) grain sorghum price (using equation 2) would be:

Expected Net Localized Price
= 1.45 bu/cwt ($2.10/bu) +
($0.38/cwt) + hedging costs
= $3.43/cwt + hedging costs

In other words, the cattle feeder could convert the current corn futures quote to an expected net sorghum price if a hedge were placed. Further, assuming the feeder has a good idea of hedging costs, one can be fairly sure that two-thirds of the time the realized price will end up being within $0.26/cwt (the MAY combined basis and hedge ratio variation) of the calculated price. Finally, assuming this was the price the feeder wanted to hedge, he should buy one 5,000 bushel May corn futures contract for each 3,448 cwt (approximately 6,157 bushels) of milo he wanted to hedge. Mini-contracts (traded on the MidAmerican Commodity Exchange, or MCE) of 1,000 bushels per contract could be used in a similar fashion to hedge 690 cwt (1,232 bushels) of milo per contract. As the cattle feeder purchases sorghum in the cash market in April and May, he should liquidate (sell back) one 5,000 bushel corn contract for each 6,157 bushels of milo purchased.

2. Barley Producer. Suppose that in March a Minnesota barley producer decided to hedge part of his expected feed barley production which he plans to sell in July at harvest time. The first step should be to calculate the expected net localized barley price that the corn futures market is offering. Assume that the July corn futures price in March is $2.40/bu. The expected net localized equivalent barley price can be calculated using the information in Table 1 as follows:

Expected Net Localized Price
= 0.67 bu/bu ($2.40/bu) +
($0.17/bu) - hedging costs
= $1.78/bu - hedging costs

The barley producer could be relatively sure that two-thirds of the time he would receive somewhere between $1.53/bu ($1.78/bu - $0.25/bu) and $2.03/bu ($1.78/bu + $0.25/bu) for the barley that was hedged (less hedging costs) depending upon the basis. For each 7,463 bushels of barley the producer wanted to hedge he should sell one 5,000 bushel corn futures contract. Smaller quantities could be cross hedged through MCE 1,000 bushel mini-contracts. When the barley producer sells barley in the cash market in July he should buy back the futures position.

Cross Hedging Selected Livestock

In much the same manner that selected crops can be cross hedged in crop-related futures markets, selected livestock can be cross hedged in livestock futures markets. Tables 3 and 4 provide the statistics necessary to determine the expected net localized prices, the quantity of cash commodity recommended per contract, and a measure of expected basis and hedge ratio risk for cross hedging Kalona-Knoxville, Iowa, feeder pigs in live hog futures and Sioux Falls, South Dakota, slaughter lambs in live cattle futures. The information in these tables can be used in exactly the same fashion as the information contained in Tables 1 and 2. The following examples should further clarify this.

Examples

1. Feeder Pig Producer. Suppose that in July an Iowa feeder pig producer wanted to hedge the selling price of feeder pigs he would be raising which he anticipated selling at about 40 pounds in September and early October.

Suppose that in July the October live hog futures price was $55/cwt. The expected net localized feeder pig price could be calculated as follows:

Expected Net Localized Price
= 1.37 cwt/hd ($55/cwt) +
(-$24.92/hd) - hedging costs
= $50.43/hd - hedging costs

The feeder pig producer should sell one 30,000 lb CME (Chicago Mercantile Exchange) October live hog futures contract for each 219 head of feeder pigs he wanted to hedge at an expected price of $50.43/hd less hedging costs. The producer could expect that there is at least a two-thirds chance that the price received will be within $5.79/hd of $50.43/hd less hedging costs. As the feeder pigs are sold in the cash market in September and October the producer should buy back one 30,000 lb live hog futures contract for each 219 head of feeder pigs sold. Mini-contracts (MCE) of half the size (15,000 lbs) of the CME contracts could be used to hedge half as many feeder pigs per contract.

There is some evidence that one may be able to hedge feeder pig sales (purchases) by placing simultaneous short (long) hedges in live hog futures and placing long (short) hedges in corn futures since corn prices and live hog futures prices should have a stronger joint relation to feeder pig prices than live hog futures alone. That is, feeder pig prices are related to expected feeder pig production profitability which is a function of expected feed costs (corn futures prices) and expected live hog prices (hog futures prices corresponding to the date the feeder pigs would be slaughtered). However, previous research indicates that it typically has been less risky to hedge feeder pigs only in the live hog futures rather than placing a joint live hog-corn futures hedge. Also, the nearby live hog contract performed as well as the deferred contract corresponding to the date the feeder pigs would be sold.

2. Lamb Producer. Suppose that in April a South Dakota lamb producer wanted to cross hedge lambs which he expected to be selling in early August. The lamb producer observes the August live cattle futures price in April is $62/cwt. Using the information in Table 4, the producer can calculate an expected lamb price equivalent of the cattle price if he were to hedge as follows:

Expected Net Localized Price
= 0.46 cwt/cwt ($62/cwt) +
$32.74/cwt - hedging costs
= $61.26/cwt - hedging costs

The lamb producer could expect the $62/cwt live cattle price to be approximately a $61.26/cwt hedgeable lamb price less any hedging costs. The basis and hedge ratio risk associated with cross hedging lambs indicates that the producer could expect that two-thirds of the time the realized price should be between $68.20/cwt and $54.32/cwt less hedging costs. It is obvious that there is a significant risk associated with cross hedging lambs in this manner and the producer must weigh this risk against the risk of price changes if unhedged. At different geographic locations the lamb price may be more highly correlated with the cattle price and cross hedges may not be as risky at these locations. The lamb producer should sell one 40,000 lb cattle futures contract for each 870 cwt of lambs he is hedging. Mini-contracts on live cattle futures of 20,000 lbs are also available through the Mid-American Commodity Exchange for smaller-scale hedgers.

Recommendations for Cross Hedgers

The specific hedge ratios and corresponding information presented in this fact sheet should not be used as is. That is, producers facing local markets with price patterns different from the specific ones addressed here will have a different hedge ratio, basis, and associated basis and hedge ratio risk or variation. This fact sheet is primarily a guide for determining how to use hedge ratios and is intended to help identify the types of risks one faces in a cross hedging marketing strategy. Individuals wanting to cross hedge should estimate these relationships for their specific geographic locations, either with the aid of computer software or by some other method.

Cross hedging will not eliminate price risk entirely, just as normal hedging does not. Basis risk is present in any hedging program. However, basis fluctuations can be either beneficial or detrimental to the hedger depending upon whether one is a short or long hedger and on the direction of change in the basis. Producers pondering cross hedging need to consider the combined basis and hedge ratio risk they can expect to face by cross hedging and they need to compare that to the price risk they expect to face if unhedged. Often, combined basis and hedge ratio risk may be greater than price risk and cross hedging would actually increase price risk in these instances. Lambs, for example, have a relatively large basis risk with live cattle futures (and even a greater basis risk with live hog futures) and the basis risk may be greater than the risks of being unhedged. Grain sorghum, on the other hand, typically has a relatively small basis risk with corn futures, and basis risk may be smaller than price risk for grain sorghum. In addition, production risk cannot be ignored in any marketing program and should be considered when developing a marketing plan.

The information reported here is intended only to help the producer determine the equivalent price that could be hedged, the size of position to take for a given cash quantity, and the associated basis and hedge ratio risk. It is not intended to signal when the producer should place a hedge. The decisions of if and when to hedge must be based on analyses of costs of production, desired returns, degree of risk aversion, and current fundamental expectations and economic information. Not until this information has been gathered and analyzed should the producer be concerned with what size of position to take in the futures market. The decision to hedge only a percentage of expected production (or purchases) may be a viable strategy and the information contained in this fact sheet should help one determine the size of futures position to take for hedging a desired percentage of production.

Futures contracts have fixed quantity specifications; corn contracts, for example, are 5,000 bushels on the CBT and 1,000 bushels per contract on the MCE. As a result, it is unlikely that hedges can be placed to cover the exact quantities of the commodity a producer wishes to hedge and either over- or under-hedging will occur. Whether to over-hedge or under-hedge is a decision the individual hedger will have to make by weighing the relative risks and expected payoffs from taking a smaller or larger futures position.

As is true for all types of marketing decisions, after the

cross hedging transaction has been completed the hedger should evaluate how it performed. When evaluating cross hedges the first question one needs to investigate is how close the expected price was to the net price received after deducting any gains or losses in the futures market and any brokerage fees. The evaluation of how well or how poorly the cross hedge performed should be done independently of deciding whether or not it was wise to have taken a market position at the time it was taken. A separate evaluation of the marketing strategy is required to determine this.

The information presented here can be used to take option positions on commodity futures contracts as well as to place hedges. In fact, option positions offer much more flexibility to the option holder than do futures positions. Thus, producers considering hedging should also consider the possibility of using options on futures to set an expected minimum selling or maximum buying price. The hedge ratios reported here can be used to determine the size of option position to take. In addition, purchasing options can help reduce a significant portion of adverse basis risk inasmuch as the option can always be left to expire if it has no value, costing the producer only the premium, opportunity cost on the premium, and associated brokerage fees.

Cross hedging is by no means limited to the few commodities outlined in this discussion. It is conceivable that any commodity could be cross hedged in any futures contract. However, in many instances and in many locations, basis risk may be greater than expected price risk. Prior to cross hedging any commodity, one should quantify the expected basis and hedge ratio risks. It is possible that certain commodities will have lower (or higher) basis and hedge ratio risk than price risk at certain times of the year.

For More Information

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Note: Computer software is being developed to help producers calculate and evaluate cross hedging potentials for specific commodities in their own markets. The software will contain futures prices and formulas to enable producers to enter their local market prices, estimate the cross hedge relationships, and evaluate the cross hedging potentials. The software requires Lotus 1-2-3 version 2.0. For more information write to: Ted C. Schroeder, Department of Agricultural Economics, Kansas State University, Manhattan, KS 66506.

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