Module 6

Understanding the Three Components of Price Risks

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Topics

Introduction

Cash prices received by grain producers prior to harvest or during the storage period depend upon three elements: futures prices, the basis, and possibly the spreads or difference in the nearby and deferred futures prices. Since all three of these elements are continuously changing, cash prices received by producers may also be changing. Understanding and managing the risks underlying these three components of the cash price is essential for managing profits and financial risks. As explained in Module 5, price and yield risks are correlated for major grain producing areas. Although only price risks will be examined here, the modules following this lesson will examine risk management tools that control for both price and yield risks.

In the first part of this lesson, futures markets and the risks associated with futures prices are described. In the second part, the basis is defined, the link between the futures market and the cash market is identified and basis risk is analyzed and compared to futures price risk. Lastly, the role and the risk that futures price spreads play in the formation of improvements in basis and changes in localized cash prices are examined.

FUTURES MARKET

*(or go to **Topics**)*

A futures exchange is a central marketplace with established rules and regulations where buyers and sellers trade contracts for delivery in some future time period. Although most futures contracts are offset and grain is not delivered, there are five delivery months for corn and wheat: March, May, July, September, and December. There are seven delivery months for soybeans: January, March, May, July, August, September, and November. Most Cornbelt grain merchandisers, processors and some producers buy and sell futures contracts on the Chicago Board of Trade to transfer price risks to others. The Minneapolis Grain Exchange is also an important futures market for those who produce, trade and process spring wheat in the western Cornbelt and Plains areas. The Kansas City Board of Trade provides similar services for producers of hard winter wheat in the central and southern Great Plains. Futures exchanges are also located throughout the world and are being introduced into the former socialist's economies of Russia and Eastern Europe and into China.

Futures Prices *(or go to **Topics**)*

Futures prices for each delivery period are determined by the actions of both buyers and sellers. If buyers are more active in the market than are sellers, the market is bullish and prices trend upward. In contrast, when offers to sell exceed offers to buy, prices trend downward or the market is bearish. Simplistically stated, as buyers from throughout the world enter (exit) the grain market, demand increases (decreases) and futures prices rise (decline). On the other side of the market, anticipated increases (decreases) in supply cause prices to decrease (increase).

Because of weather patterns, U.S. and foreign grain policies including absence of grain reserve policies in the U.S., Canada, and E.U., and the growing importance of international production and consumption of grains, futures prices are very volatile. Thus, futures price risk, or the potential for losses due to low prices is relatively high for grain producers. To illustrate the potential for price risk, weekly or Thursdays' December corn futures prices were averaged together for the 1981 to 1996 period (**Figure 1** and **Table 1**). Weekly seasonal corn futures prices, on average varied by only $0.20/ bushel from highs in the $2.40/ bushel range at harvest time to highs in the $2.60/ bushel range in early summer before harvest. Since averages tend to mask the degree of risk that exists in each individual year, price behavior in individual years must also be examined. Weekly prices increased significantly in one out of every five years reflecting a short fall in crop from a drought or from a major increase in demand. In contrast to these years, over-production relative to demand for grain caused prices to fall in several other years. For the 1981 to 1996 crop years, weekly corn December futures prices varied from a low of $1.52/ bushel in1986/87 to a high of $3.71/ bushel in 1995/96. July futures prices for the same period were even move volatile ranging from a low of $1.62/ bushel in 1986/87 to a high of $5.00/ bushel in 1995/96.

The volatility in the futures grain market or the amount of price risk exposure can be analyzed using the standard deviation and the coefficient of variation. The standard deviation is a measure of the dispersion of data around the average or mean. The coefficient of variation is the standard deviation expressed as a percentage of the mean. Thus, it is possible to compare the dispersions of two or more sets of data that are expressed in different units. That is, it would be difficult to compare the amount of volatility in the corn and soybean markets using just the standard deviations of each because soybean prices are higher than corn prices and thus one would expect the standard deviation for soybeans to be greater than for corn. Using the coefficient of variation, a percentage measure, allows for the comparison of volatility or risk between the two markets even though the two sets of data are not identical. The following analysis is based on weekly (Thursday's) data from the Chicago Board of Trade

(CBOT). These findings are applicable for all readers whose cash prices are based upon CBOT prices. Further, the process is applicable for analyzing risks of all other futures markets.

Based on the standard deviations, weekly December futures corn prices fell within a $0.30 to $0.55/ bushel range about the weekly mean 68% of the time (**Figure 1** and **Table 1**). Prices were most volatile in the early spring and summer period and least volatile during the winter months. The coefficient of variation was in a 14 to 20% range for most of the year. Thus, there were many periods when high (low) prices generated unexpected profits (losses) for grain producers. For all of the 1995/96 crop year, weekly corn December futures prices were more than one standard deviation above the 1981 - 1996 mean. For part of the year, prices were more than two standard deviations above the mean, a probable outcome of less than five percent.

Although the corresponding graphs are not presented here, soybean and winter wheat prices are equally volatile. For the 16 year period, weekly soybean November futures prices averaged in the low $ 6.00/ bushel range at harvest time and averaged near $6.40 / bushel in early summer; 68 percent of the time weekly prices varied by $0.90/ bushel about the mean at harvest time and by $1.20 / bushel in late summer. Based on the standard deviations, the risk associated with soybean futures prices is more than double the risk associated with corn futures prices. Since the coefficient of variation for soybeans ranged from 9 % to 20%, on a percentage scale the risk associated in the corn and soybean markets is nearly equal (**Table 1**).

Weekly wheat July futures prices average $3.30 / bushel at harvest and achieved average highs in the $3.40 range in late spring; 68% of the time weekly average prices varied by $0.44 / bushel about the mean at harvest time and $0.70/ bushel about the mean in late spring. The coefficient of variation was in the 11 to 24 % range. Thus, the risk associated with the wheat futures prices is about the same as the risk associated with corn futures (**Table 1**).

These data illustrate that annually, corn, soybean, and wheat producers face significant levels of futures price risks. The most volatility or risks appears in July and August for corn, August and September for soybeans, and in April and May for wheat. Risk exposure is highest for all three crops when the production potential is unknown. Based on the coefficient of variation, the amount of risk expressed in percentages is about the same for all three crops (**Table 1**). Weekly futures price data are maintained at Ohio State University.

CASH GRAIN MARKET

*(or go to **Topics**)*

A cash grain market is a local area in which buyers and sellers exchange a specified quality and quantity of grain in either a present or future time period for a negotiated price. Unlike the futures market, nearly all contracts require the seller to deliver grain to the buyer. Exceptions to delivery occur when weather conditions limit production. The cash price paid by the buyer reflects both a referenced futures price and a known or estimated basis. The local buyer, often an elevator, monitors the changing futures prices and subtracts or adds the basis to create a price bid to a local grain producer. Thus, the local cash price formula is:

$\text{Cash Price}_t = \text{Futures Price}_t\ (+)\ \text{or}\ (-)\ \text{Basis}_t$

Basis *(or go to* ***Topics*** *)*

Basis is defined as the amount in cents per bushel a specified local cash price is above or below a futures price for a specified delivery month. Unlike the futures price which reflects international supply and demand relationships, basis reflects only local supply and demand conditions. Thus, a basis must be calculated for each cash market. Stated as a formula: $Basis_{mt}$ = cash $price_{mt}$ - futures $price_t$, where $_m$ equals a specific market and $_t$ equals a time period. In the grain industry, the term basis is often interpreted as the difference between the price of cash grain at a delivery point and the nearby futures contract, the next futures contract in which delivery can be made. For the third week of October, the respective nearby corn and wheat futures contract is December. Since delivery begins about December 1, on that date the next nearby futures contract for both corn and wheat will be the following March. By rolling contracts forward at the beginning of the delivery period rather than at expiration (about December 20, in this example), avoids extreme price volatility. Remember that futures price limits are removed during the delivery period. In the following examples, the January futures contract is considered to be the nearby contract for soybeans at harvest time.

Although the following basis examples reflect local supply and demand relationships for a central market in Ohio, the methods used to calculate the central Ohio basis may be used for any other local market. Most state extension specialists at your respective universities are maintaining basis databases. If you need to acquire these data, please contact your state specialists directly or contact your county agent.

To calculate the nearby central Ohio corn basis for the third week of October, the above formula is used:

Basis in $_{\text{(October)}}$ = cash price in $_{\text{(October)}}$ - December Futures in $_{\text{(October)}}$

-$0.15 = 3.10 - 3.25

The negative sign indicates that the nearby central Ohio corn basis is $0.15/ bushel under the nearby December futures contract. If a positive sign were attached to the basis, then the basis would have been $0.15/ bushel over the nearby futures contract. Hereafter, all references to a nearby basis imply that the nearby futures is subtracted from the cash price.

Basis may also refer to the cash-futures relationship of a more distant futures month. A deferred futures month is defined as one that expires after the nearby futures contract. Hereafter, a deferred basis implies that a distant futures contract price was subtracted from the cash price.

Based upon the above two definitions, let’s compare and contrast the October 19, 1995 central Ohio nearby (December 1995) corn basis with the deferred corn bases for the 1995/96 crop year. This example is applicable for any year, grain and/or cash market.

	Nearby	Deferred			
Futures Contracts	December 95	March 96	May 96	July 96	September 96
Nearby/Deferred Spreads ($)		+0.06	+0.06	+0.04	-0.29
Futures Prices ($)	3.25	3.31	3.31	3.29	2.96
Cash Price, Oct. 19, 1995 ($)	3.10	3.10	3.10	3.10	3.10
Basis ($)	-0.15	-0.21	-0.21	-0.19	+0.14
Nearby vs. Deferred Bases ($)		+0.06	+0.06	+0.04	-0.29

In this example for central Ohio, the nearby basis is $0.15/ bushel under, while the deferred March 1996, May, and July 1996 deferred bases are $0.21, $0.21, and $0.19/ bushel under, respectively. Notice that the difference between the nearby basis and any deferred basis is the spread, or the carry in the futures market. Because of the inverse carrying charges or the inverted December 1995-September 1996 spread, the September 1996 deferred basis is $0.14/ bushel over the futures contract.

Since the grain industry makes its decisions on the nearby basis and the carry in the futures market, for consistency purposes knowledgeable producers should follow the same nomenclature. Hereafter, in this lesson, all references and analysis will focus on the nearby basis.

1. Basis Patterns *(or go to* ***Topics*** *)*

To use basis to select marketing alternatives and to make storage decisions, it is important to define a number of terms. A basis pattern is the behavior of basis or its expected trend during a crop year and over a number of crop years. For normal crop years, basis tends to improve during the crop year. In **Figure 2**, the basis is weak in October at $0.40/ bushel under the nearby futures contract. By July, the basis improved or is strong, equaling **-$0.25/ bushel**. **In this case, the change in the local basis is an indication that the farmer may want to store grain.** The final decision depends on whether the returns to storage offsets the cost to store grain. In contrast, for a short crop year, the basis pattern may not improve or may in fact weaken (**Figure 3**). Inverted spreads (**Figure 4**) and very strong basis at harvest time are signals that the market wants the crop now. In this case , the basis improvement and spread will not cover storage costs.

The terms "strong" and "weak" are relative expressions. By definition, a basis is strong when the present basis is greater than the historic average basis. Assuming that the present central Ohio nearby corn basis is -$0.15/ bushel and the average nearby basis is normally -$0.25/ bushel, the present nearby basis is strong by definition. If in contrast the present basis is -$0.35/ bushel, the present nearby basis is weak by definition. By definition, the relative term "weak" signifies that the current basis is less than some historic average.

2. Basis Risk Factors *(or go to* ***Topics*** *)*

Basis risk is the probability that basis will weaken relative to some expected historic average or the probability that the cash price received by the producer will fall. That is, a weaker than expected basis will cause the cash price to decline. Although basis tends to strengthen during the marketing year and converges at the delivery points during termination of the futures contract, daily, monthly, and annual fluctuations do occur. The causes of the fluctuation are related but have unique differences. Several factors causing basis to fluctuate are:

SUPPLY AND DEMAND FACTORS -- Futures price patterns reflect international supply and demand relationships. Although local basis patterns are also influenced by national and international events, ordinarily basis patterns are more responsive to local supply and demand conditions. Basis will be stronger if the available supply of grain to a given grain handler or market is scarce relative to the demand, e.g., one area of the country experiences a drought while another area has normal weather patterns. Everything else equal, the basis will be stronger in the drought area relative to the basis in the normal weather pattern area. Basis will also strengthen in an area in which demand is increasing relative to supply. For example, basis will strengthen when there is a need to load a ship, barge, or train. Once loaded, the local basis may weaken.

TRANSPORTATION -- Availability of transportation to move the crop either at harvest time or during the market season can affect basis. If transportation equipment is not readily available, basis will weaken. Increases in shipping rates also weaken the basis. Because of favorable or relative low transportation rates into the northeastern U.S. grain market, east coast export market, and the southeast U.S. grain and Gulf export markets, Ohio and other eastern cornbelt areas have relative strong bases compared to the bases in the western cornbelt.

STORAGE AVAILABILITY -- Amount of storage available at a local market or location can affect basis. If storage facilities are committed or demand for storage space is increasing, the basis will respond by weakening. This is the market’s way of encourages the producer to find storage elsewhere such as on the farm.

STORAGE COSTS - -The cost of storage is affected by two major factors, (1) general inflation and (2) interest. General inflation affects the cost of erecting storage facilities and the rates charged by commercial storage operators. As the costs to store grain on the farm increase or commercial storage rates increase, basis weakens. A second very important cost is interest, either foregone interest that could be earned on the cash from the sale of a commodity or interest actually paid to provide needed working capital in lieu of selling the grain. The higher the interest rate and the longer the storage period, the weaker the basis.

SEASONALITY OF HARVEST -- Grain crops are harvested over a short period of time. This may place great demand on handling and transportation facilities during the harvest season resulting in weaker basis. If, on the other hand, the harvest season progresses slowly due to bad weather, this will tend to strengthen basis.

LOCATIONAL DIFFERENCES -- Basis varies among markets because distances to common demand centers vary. Markets have unique demand centers; therefore, market (A) can ship grain to the Northeastern U.S. and market (B) cannot, and different modes of transportation are available to different markets. The basis is stronger in those markets that have relatively more potential demand centers and/or have lower transportation rates.

PROTEIN SUPPLY AND CONDITIONS OF CROP -- Protein content of wheat and soybeans can influence local basis. If the protein content of either of these crops is low, processors are forced to buy more of the commodities to produce the desired quality of flour, meal or oil. Thus, basis may strengthen. Alternatively, the basis may weaken if the end user decides to correlate the value (protein content) of the raw commodity to the end use value. In a similar vein, a buyer may bid up the basis to obtain grain or oilseed that has above normal protein levels. This is often true when the commodity is in short supply. Processing and handling costs are reduced because less of the commodity is processed to produced end products. Finally, high moisture conditions may tax drying facilities and market grade requirements, resulting in a weaker basis during the harvest period.

3. Basis Risks Relative to Futures Price Risk *(or go to* ***Topics*** *)*

As measured by the standard deviation, the variation or risks associated with bases tend to be more predictable and less extreme in cents per bushel terms than the observed changes in futures prices. To illustrate this point, weekly corn, soybean and wheat basis data have been averaged together for the 1981 to 1996 period for a central Ohio market. **Figure 5** and **Table 2** displays the weekly corn basis data. At harvest time, this weekly corn basis averaged $0.15/ bushel under the nearby futures for this central Ohio market. Since the average basis strengthen to about $0.15/ bushel over by mid July, the weekly corn basis in central Ohio improved by $0.30/ bushel. At harvest time and later during the storage period, basis varies about the mean basis by $0.10/ bushel 68% of the time. In contrast, one standard deviation about the weekly futures price mean at harvest time was $0.30/ bushel. As measured by the standard deviation in cents per bushel, the risk associated with futures prices is three times the risk associated with the basis for corn at harvest time. The differences in risk are even more pronounced when examined for the winter feeding period. Throughout most of the winter months, the basis varies about the mean by less than $0.07/ bushel 68% of the time. For the same period, the corresponding futures price risk is nearly **eight times greater** than the basis risk ranging about the average at $0.55/ bushel. The coefficient of variation for basis is much higher than for the corn prices; however, it is the absolute change in price that determines the risk exposure for the producer.

The weekly harvest (October - November) basis for soybeans averaged $0.23/ bushel under the January futures price for the central Ohio market (**Table 2**). By July, the weekly average basis was near zero ($0.00); thus, the basis improved by $0.23/ bushel. At harvest time, the standard deviation about the weekly basis was $0.11/ bushel compared to the $0.90/ bushel standard deviation for the corresponding futures prices. Thus, the risk exposure as expressed in cents/ bushel **was more than eight** times greater for futures prices relative to the basis. As was the case for the corn market, the standard deviation around the basis mean fell into the four to five cent range for most of the winter months. Since the standard deviation for the weekly average futures prices approached the $1.20/ bushel level, risk associated in the futures market was 24 times greater than what occurred with the basis. The coefficient of variation was again much greater for the weekly average basis than it was for weekly average futures prices.

In July, the weekly average wheat basis equaled $0.16/ bushel under the nearby futures price for this central Ohio market (**Table 2**). It should be noted that throughout the summer, the weekly basis weakened reaching a low of $0.30/ bushel under the nearby futures prices in the second and third weeks of September. The market in Ohio is saying, "sell the wheat now; do not store it into September." For those producers who routinely store wheat into September, they lose on average $0.14/ bushel in basis performance, plus storage and interest costs.

Without this knowledge, the basis risk approaches 100% for these producers who are unaware of these summer basis trends. After September, the weekly average basis improves reaching $0.07/ bushel under the nearby in April. Thus, on average, wheat basis improves by $0.09/ bushel in this central Ohio market.

The standard deviation about the weekly average wheat basis at harvest time is $0.13/ bushel. Since the corresponding standard deviation for the futures price is $0.44, there is about three times more risk in the futures market than in the basis. The weekly basis risks increases throughout the marketing year reaching the $0.20/ bushel range by late spring. The risk associated with the futures market is more than three times larger than is the basis risk for this time period. Again, the coefficient of variation is larger for the weekly average wheat basis than for the corresponding futures price.

In summary, remember that the **cash price $_t$ = futures price $_t$ (+) or (-) basis $_t$**. Although these two components make up the cash price offered to the producer, there is much more risk in terms of absolute dollars with the referenced futures price than there is with the basis. As you will learn in futures lessons, different marketing strategies and insurance products are designed to manage the risk for these two components.

FUTURES PRICE SPREADS

*(or go to **Topics**)*

Spreads in the futures prices are the difference between the nearby futures price and some deferred futures price. Since there are intra crop-year and inter crop-year spreads, each are discussed separately.

1. Intra Crop Year Spreads *(or go to **Topics**)*

Intra crop year spreads cover the crop year from harvest to the end of the storage period. For corn, this would be from October to the following September. For example, assume that in October, the nearby December futures contract is trading at $2.50/ bushel, the following March at $2.55, the May at $2.62, the July at $2.70, and September futures is at $2.65/ bushel (**Table 3**). The differences between the nearby and deferred contracts-- $0.05/bushel between the December and the March, $0.12/ between December and May, etc. are the spreads between the nearby contract and the deferred contracts. Within a crop year, the spread represents the carry in the futures market or the amount of premium that the futures market allocates to cover the cost of storing grain. In this example, traders in the futures market are willing to pay $0.05/ bushel to have producers and others store grain from December into March, $0.12 to store to May, $0.20/ bushel to store to July, and $0.15/ bushel to store into September.

Since these intra or crop year spreads represent the carry in the market, they are part of the payment for storing grain and comprise a portion of the basis improvement. Basis improvement is the change in the size of basis during two time periods. For example, assume that in October, the December nearby futures contract is trading at $2.50/ bushel and the elevator buyer is paying $2.35/ bushel for delivery in October. The harvest basis is $0.15/ bushel under the nearby futures ($2.35 - $2.50). Assume that is June, the month before the July contract expires, the anticipated or expected nearby basis is +$0.05/ bushel. This means that the local price relative to the respective nearby futures contracts is expected to improved from $0.15 under at harvest time (difference between the October cash price and the December nearby futures price) to $0.05 over in June (difference between the June cash price and the July futures price). Thus, locally the cash price or basis is expected to improve by $0.20/ bushel. At harvest time, the December -July known spread is $0.20/ bushel or the futures market is paying $0.20/ bushel to store corn from December to July. Total basis improvement from December to June or payment for storage is $0.40/ bushel ($0.20 local improvement plus the $0.20 spread). Hypothetical basis improvement data for other delivery periods are also provided in **Table 3**.

The formula for the total basis improvement is: total basis improvement (TBI) = spread at harvest (SP) + [nearby basis at harvest (NBH) - nearby basis in delivery period (NBD)(-1)]. The negative one (-1) is required to convert the negative sign attached to the basis to a positive number in order that the basis improvement can be added to the spread. In the above example, total basis improvement between harvest and the July delivery month is:

TBI = SP + [(NBH - NBD)(-1)]

$0.30 = $0.20 + [(-$0.15 - $0.00)(-1) + $0.05]

$0.30 = $0.20 + ($0.15 + $0.05)

In this example, the basis at harvest time improved from 15 cents under to five cents over. Thus, the basis improved $0.15 between -$0.15 and $0.00 plus an additional $0.05. As long as the basis remains even ($0.00) or negative, this extra step is not necessary. Basis improvement for May for example is:

$0.27 = $0.12 + [(-$0.15 - $0.00)(-1)]

$0.27 = $0.12 + $0.15

Since the spread between any nearby futures contract and deferred contract is known at harvest time prior to storage, those who lock in the spread with either a hedge, forward contract, etc. eliminate all risks associated with the intra or crop year spread. In addition, the nearby harvest basis is also known and is risk free. The unknown or the risk for storing grain is the nearby basis in the delivery period. Since the standard deviation about the basis mean or average during the storage period is very low for both corn and soybeans, the risk associated with storing these crops is also very small. In contrast, those who store grain by speculating on both futures price improvement and basis improvement accept the combined futures price, spread, and basis risks during the storage period.

Even though intra year spreads maybe risk free at harvest time, these spreads do vary from one year to another. In short-crop years when the market wants the grain now rather than is some deferred period, the spreads at harvest time will be vary narrow. If in contrast, there is an abundant supply of grain relative to demand at harvest time, the spread will be wider to encourage producers to store grain into a deferred period.

2. Inter Crop-Year Spreads *(or go to* ***Topics*** *)*

Inter crop-year spreads are the differences in futures prices across crop years. The inter crop-year spread that is most commonly used by grain producers is the old-crop new-crop spread. In years following short crop years, the old-crop futures price will often be greater than the new- crop futures price. The old-crop futures price is relatively high in order to ration the limited supply of grain to end users. New crop prices increase to a level that will cause grain producers from throughout the world to plant enough acres to meet futures demands and to replace inventories. Since grain producers are relatively responsive to the higher new-crop prices, new- crop prices tend not to rise as rapidly as old-crop prices.

In the past, some produces have priced the new-crop on the old-crop price with the expectation that the old-crop contract would be rolled into the forthcoming delivery period. Assume that the July old-crop corn futures price in March is trading at $3.30/ bushel and the December new-crop corn futures price is trading at $2.50/ bushel. The inter crop or old-crop new-crop spread is $0.80/ bushel or the spread is inverted. The grain producer may elect to lock in the $2.50 December futures price for delivery in October or the producer may elect to lock in the $3.30 July futures price with the expectation that this contract must be rolled into December for delivery in October. Pricing on the old-crop price is advantageous provided that the spread narrows. Losses occur or risk exposure appears because there is some probability that the inter crop spreads will widen.

Ignoring basis, the producer who locks in the $2.50 December futures price will receive the $2.50/ bushel at harvest time. The producer who locks in the $3.30 per bushel old crop price will receive $3.00/ bushel at harvest time if the old-crop July futures new-crop December futures spreads narrow from $0.80 to $0.30 / bushel prior to the expiration of the July futures contract. In contrast, the producer may receive $2.00 / bushel at harvest time if the old-crop new-crop spread widens from $0.80 to $1.30/ bushel and remains there. Thus, another element of risk is accepted by the producer who prices grain on inter year spreads. The final price for the grain is:

Cash price = Futures price (+) (-) basis + the change in the inter year spread

The outcome for the above example when the inter crop spread narrows is:

$3.00 = $2.50 December futures price - $0.00 basis + $0.50 narrowing of spread.

The outcome for the above example when the inter crop spreads widen is:

$2.00 = $2.50 December futures price - $0.00 basis - $0.50 wider spread.

Figure 6 illustrates the inter crop year spread risk for corn. Similar data are available for soybeans and wheat but are not reported here. For all years, corn inter crop spreads were within a $0.10 to $0.15 / bu range, on average. Following short crop years, an inverted spread appeared early in the storage period and then would narrow prior to delivery. In 1996, the year of the hedge-to-arrive difficulties, the inter year spreads did not narrow. Instead the weekly Thursday's spread widened to a maximum of $1.46/ bushel. Based on the 16 years of data, the weekly standard deviation above the mean reached a high of $0.54/ bushel In 1996, the inter year corn spreads were at times more than three standard deviation above the average, an outcome that will occur less than 1% of the time.

These data suggest that there is significant inter year or old-crop new-crop spread risks. The probabilities that the spreads will narrow may be declining giving the changes in government policies and the affects of free trade. In other words, inter year spreads may behave differently when carry-in is very small and the short crop phenomenon is caused by increasing demand rather than a short fall in supply. This was observed in 1996 when the July old-crop December new-crop corn spreads did not narrow prior to the expiation of the July futures contract. The old-crop new-crop soybean spreads also widened in 1997. Although these observations are very limited and it would be unwise to draw any definitive conclusion, there does appear to be significant risk in inter year spreads. As will be discussed in future lessons, inter year spread risk can be managed by placing stop-loss orders with a broker or grain buyer. These orders are an important part of ones marketing and management plan.

End of Module *(or go back to* ***Topics*** *)*

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