



# Current Report

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## 1979-1982 Basis Relationships for Corn in the Oklahoma Panhandle

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This report contains a summary of monthly average basis relationships that have existed between Chicago corn futures contracts and Beaver, Oklahoma, corn prices for calendar years 1979-1982. Its purpose is to illustrate the volatility of these relationships over the period as well as to provide information that can be used by individuals who are interested in hedging this crop in the Oklahoma Panhandle. Individuals who normally do not trade at this location should find this information useful, too; these figures may be altered to fit other locations by adjusting the basis numbers by the customary price difference that has existed in the past few years between their location and Beaver.

Basis is simply the difference in price between a futures contract price and a local price for the same commodity (futures - cash). Since a futures contract is a contractual agreement that calls for delivery of a commodity in one or more major U. S. cities, an Oklahoma hedger must adjust the contract price to estimate the actual price he expects to see as a result of placing the hedge. This adjustment factor is the basis relationship which is expected to prevail on the day the hedge is lifted and the cash transaction occurs locally.

An example of the calculations required to estimate the expected

localized hedged price is given below in Figure 1:

November 15	
Buy Chicago Corn	\$2.70/bu.
Less: Expected	
Basis on Jan. 15	-(-.15/bu.)
Expected Hedged	
Price	2.85/bu.
Plus: Brokerage Fees	.01
Interest Charge	
on Margin	.01
Expected Net Hedged	
Price	\$2.87/bu.

Figure 1. Buy Hedge Calculations

In this case a hedger located in Beaver expects to buy 50,000 bushels of corn in January. The price of a March futures contract on November 15 is \$2.70. If the hedger expects a basis of \$-.15/bu., the expected hedged price (before transaction costs) is \$2.85/bu. The larger the basis, the lower becomes the expected hedged price. In this case, a hedger should be willing to buy a Chicago corn contract to protect himself from rising prices between November and January only if he expects the Beaver cash price to exceed \$2.87/bu and he wishes to avoid that risk. If he buys a futures contract the hedge will be initiated. It will be lifted the day the contract is sold and the cotton purchased from a local supplier, on January 15.

HOW IS BASIS DETERMINED? -- Since basis represents price differences among locations, it is determined by local supply and demand conditions. These conditions are not independently determined from one town to another because our transportation system and handling capabilities allow for the transshipment of large quantities of agricultural commodities across the entire country. Therefore, the extent to which basis can be expected to grow is the cost that would be incurred if delivery was made against the futures contract near the expiration date of the contract. If the basis exceeds this level, then individuals could earn substantial profits by selling futures contracts and delivering the commodity. This activity would tend to raise prices in the local market as shippers bid for the crop required to fulfill futures contract commitments, causing the basis to fall. Therefore, transportation and handling costs place an upper bound on the level that the basis can be expected to reach. In fact, for those localities that typically supply the commodity to the city in which the futures contract is traded, the basis will hover around this level at the time of expiration for each futures contract.

Locations that tend not to supply the commodity to fulfill futures commitments are likely to have a basis that is less than the cost of delivery. Oklahoma markets fall in this category because Oklahoma is a net importer of corn from the rest of the United States, primarily from the western Corn Belt. Estimation of the expected basis for calculating an expected hedged price becomes more challenging in such local markets. The usual procedure is to examine the basis which has prevailed for the same time period over recent years and to compute the average. If transportation and storage costs, interest rates, and size of local harvests show relatively little variation from year to year, the

average basis is a good predictor of the expected basis next year. Until recent years this has been the case. It is the relative stability of basis relationships that provides a hedger reduced price risk over time. Once a hedge is established, any difference between the expected hedged price and the realized price will be attributable to the difference between expected basis and actual basis. There is always a chance that the basis prevailing on the day the hedge is lifted will differ from the average. Hedging reduces risk when the variability of basis relationships is less than the variability of local market prices.

The risk reduction associated with hedging might be illustrated by the following analogy. Suppose an individual living in Pauls Valley was asked on January 15 to predict the high temperature which would prevail on the following June 15. Numerous factors would determine the June 15 high, of course: cloud conditions, wind directions, presence or absence of fronts are just a few of them. Weather records of previous years might show a range that covers 20 degrees or more. Therefore, the odds of a successful prediction are quite low. If, however, this person were to know that the high temperature in Oklahoma City on June 15 would definitely be 89 degrees, the odds of predicting the high in Pauls Valley would improve. In such a case, the ability to predict the high in Pauls Valley would boil down to the ability to estimate the temperature difference between those two locations on that day. An estimate of this temperature difference could be derived from the experience of previous years; perhaps the average difference would be chosen. There is always a chance that the temperature difference on June 15 will differ from the average. But as long as the variability of this temperature difference is lower than the variability of actual high temperatures in Pauls Valley, then knowledge of the Oklahoma City high will reduce the risk of an inaccurate prediction.

In hedging, the quoted price of a futures contract plays the role of the exact knowledge of the high temperature in Oklahoma City. The odds of predicting the actual price to be received for corn have been improved, but the realized price could still be different than the expected hedged price calculated in Figure 1.

#### EXPECTED INTRA-YEAR BASIS CHANGES --

The typical basis pattern for a crop is for a declining basis as the expiration of the futures contract draws near. The reason for this pattern is that part of the basis reflects the storage cost that would be incurred if delivery of the commodity were made against the contract. If all other things remain constant, the basis will shrink as this storage cost declines. Harvest price pressure tends to widen observed basis relationships, but usually for only a few weeks. Therefore, it is only during unusual years, such as those in which transportation and storage costs rise continually, that basis numbers would rise as the time for contract expiration approached.

**BASIS TABLES FOR CORN --** The following tables provide average monthly basis relationships that have prevailed over the period 1979-1982. The futures contracts chosen and corresponding Oklahoma cash prices are March, July, and December Chicago corn contracts with the Wednesday quoted average cash price for Beaver, Oklahoma. All data were obtained from the Daily Oklahoman newspaper.

The average basis relationships are given in Tables 1-3. Each contract has shown large changes in average basis values from the beginning of the time the contract was traded until expiration. Furthermore, there has been considerable variation from year to year, as shown by the monthly high and low values in each table. Therefore, each monthly average basis table includes a range of

values which would include the actual basis number approximately 2 years out of 3. This range of potential basis relationships is labelled "optimistic" and "pessimistic," with the former term applying to years in which Oklahoma corn prices are relatively strong and the latter applying to years in which Oklahoma corn prices are relatively weak. This range provides one guide to the extent to which the actual price might compare to the expected hedged price. So, in the example in Figure 1, if the optimistic basis is -18 cents and the pessimistic -12 cents, there is a two-thirds probability that the actual price paid would fall between \$2.93/bu. and \$2.81/bu. This leaves a one-sixth chance of paying a price that is greater than \$2.93 and a one-sixth chance of paying a price below \$2.81/bu. As long as this basis risk is far less than the variability in local corn prices, both corn producers and buyers may find hedging to be a useful marketing or procurement tool.

The variation in basis over 1979-1982 appears rather large. Several factors may be accountable: 1) rapid increases in transportation costs would lead to a drop in the corn basis; 2) increased placement rates in local feedlots would reduce the basis (i.e., raise local corn prices relative to Chicago) through an increase in local demand, while a drop in placements would raise the corn basis; and 3) increased local corn production would tend to raise the basis through an increase in local supply, while drops in local production would lower the corn basis. All of these factors have exerted an impact at some time during the past four years, and all have changed by sizeable magnitudes. This has meant that hedging has been riskier during this time period than it had been previously; for example, a buyer who had expected a basis of 10 cents but who actually lifted the hedge with a basis of -10 cents would have paid a price that was 20 cents per bushel higher than expected. Of course, if corn prices had been rising while

the hedge was in place, this buyer would have been better off with a hedge than without it, but he still would have paid a price that exceeded his expectations.

Each hedger must estimate the basis which will prevail when the hedge is lifted if he is to know the localized price he is attempting to secure. Historical average

relationships and measures of their variability provide an indication of the value of the basis, but by no means act as perfect predictors. As long as basis variation is far less than the variability in local corn market prices, however, both buyers and sellers may find hedging to be a useful procurement or marketing tool.

Table 1. Chicago-Beaver Average Wednesday Corn Basis (cents/bu.)

	Avg.	March Contract		Optimistic	Pessimistic
		High	Low		
April	37.1	57.5	8.0	22.0	52.2
May	38.2	62.0	6.5	21.7	54.7
June	30.8	49.5	0	18.9	42.7
July	25.1	60.5	-35.5	5.3	44.9
August	17.4	45.5	-46.0	-4.1	38.9
September	27.3	53.5	2.5	12.3	42.3
October	25.2	45.0	5.5	13.8	36.6
November	20.9	55.0	-3.5	4.1	37.7
December	16.0	57.5	-10.0	-2.8	34.8
January	9.8	26.5	-11.5	-3.1	22.7
February	5.9	28.5	-27.5	-10.3	22.1
March	4.2	22.5	-27.5	-12.6	21.0

Table 2. Chicago-Beaver Average Wednesday Corn Basis (cents/bu.)

	Avg.	July Contract		Optimistic	Pessimistic
		High	Low		
August	27.3	59.5	-30.5	5.5	49.1
September	38.9	62.5	13.5	22.9	54.9
October	37.8	62.5	14.5	24.8	50.8
November	33.1	62.5	13.5	21.0	45.2
December	30.1	68.5	4.5	13.9	46.4
January	25.4	43.5	3.0	12.3	38.5
February	27.1	44.5	-3.5	11.0	43.2
March	25.6	40.5	-1.5	10.5	40.7
April	26.8	44.5	1.5	14.6	39.0
May	16.8	56.5	-11.5	5.2	28.4
June	6.9	20.5	-14.0	-2.0	15.8
July	3.2	27.5	40.5	-10.5	16.9

Table 3. Chicago-Beaver Average Wednesday Corn Basis (cents/bu.)

	Avg.	December Contract		Optimistic	Pessimistic
		High	Low		
January	26.4	54.5	11.5	10.0	42.8
February	35.5	60.0	8.5	18.4	52.6
March	34.5	60.0	7.0	16.8	52.2
April	37.1	57.5	8.0	22.0	52.2
May	27.4	49.5	-6.5	12.4	42.4
June	19.3	35.5	-15.0	8.1	30.5
July	14.5	60.5	-35.5	-5.2	34.2
August	6.1	37.5	-61.5	-16.5	28.7
September	13.4	42.5	-10.5	-1.1	27.9
October	11.0	66.0	-12.0	-2.6	24.6
November	5.1	39.5	-21.5	-13.5	23.7
December	-0.7	44.5	-27.5	-22.0	20.6