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1979-1982 Basis Relationships for Cotton

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This report contains a summary of monthly average basis relationships that have existed between New York futures contracts and Oklahoma cotton markets 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 southwest Oklahoma. Individuals who normally do not trade at these locations 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 the average southwest Oklahoma price.

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 New York Cotton	$.70/lb.
Less: Expected Basis on Jan. 15	.15/lb.
Expected Hedged Price	.55/lb.
Plus: Brokerage Fees	.001
Interest Charge on Margin	.002
Expected Net Hedged Price	$.553/lb.

Figure 1. Buy Hedge Calculations

In this case a hedger located in Altus expects to buy 50,000 pounds of cotton in January. The price of a March New York futures contract on November 15 is $.70. If the hedger expects a basis of $.15/lb., the expected hedged price (before transaction costs) is $.55/lb. The larger the basis, the lower becomes the expected hedged price. In this case, a hedger should be willing to buy a New York cotton contract to protect himself from rising prices between November and January only if he fears the Altus cash price will exceed $.553/lb. 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 transhipment 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 <u>not</u> to supply the commodity to fulfill futures commitments are likely to have a basis that is <u>less than</u> the cost of delivery. Oklahoma markets fall in this category because most of the cotton grown here is procesed here or shipped to cities well to the south of New York. 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. <u>There is always a chance that the basis prevailing on the day the hedge is lifted will differ from the average</u>. 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 wold 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 <u>difference</u> 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 wheat 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 COTTON -- 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 New York cotton contracts with the daily quoted average cash price for southwest Oklahoma. All data were obtained from the Daily Oklahoman newspaper.

Tables 1 - 3 contain the daily cotton basis numbers. These relationships have remained remarkably stable from year to year, as well as from month to month. This pattern bodes well for a hedger, whether he be a cotton producer or a buyer, because it implies that the risk of a wide swing in basis has been relatively small. There has been some basis variation from year to year, however, as shown by the monthly high and low figures given 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 cotton prices are relatively strong and the latter applying to years in which Oklahoma cotton 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 12 cents and the pessimistic 18 cents, there is a two-thirds probability that the actual price paid would fall between $.523/lb. and $.583/lb.

In general, most Oklahoma cotton is sold between mid-October and early March of each marketing year. For that reason, both December and March contracts are included in this report. The July contract is added to accommodate any unusual cases in which cotton is traded well beyond the seasonal peak. An important implication of the seasonal marketing pattern is that no matter which futures contract is used, the chances of recorded Oklahoma prices being equal to actual cash prices are greater during October-March than at other times of the year. Therefore, the recorded basis numbers must be considered more reliable during these months.

It should be stressed that the average basis numbers given in Tables 1-3 hold for the average cotton price quoted for southwest Oklahoma markets each day. So, any location that has cotton bids below the southwest average will have a larger expected basis than those indicated by the data in Tables 1-3. Furthermore, differences in cotton quality often lead to substantial discounts or premiums in Oklahoma cotton markets. A producer who typically sells a grade of cotton which fetches a local price that is 8 cents per pound above average, for example, would have a basis that is 8 cents smaller than

the average in Tables 1-3. Conversely, any cotton which normally sells below the local average price due to quality problems would have a larger basis than the average indicated above.

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 cotton market prices, however, both cotton buyers and sellers may find hedging to be a useful procurement or marketing tool.

Table 1. New York-Oklahoma Monthly Average Cotton Basis (cents/lb.).

	March Contract				
	Avg.	High	Low	Optimistic	Pessimistic
April	18.3	23.9	9.7	13.2	23.4
May	15.8	22.5	8.5	11.0	20.7
June	13.9	22.1	- 1.1	9.1	18.7
July	15.7	19.4	10.1	12.8	18.7
August	15.4	22.5	10.2	12.9	17.9
September	14.0	24.2	10.0	11.1	16.8
October	14.4	17.3	9.4	12.4	16.3
November	13.7	15.8	11.9	12.4	15.0
December	14.8	17.1	10.7	12.9	16.7
January	15.5	17.8	11.5	13.8	17.2
February	14.8	22.5	10.6	12.2	17.4
March	13.7	21.7	10.7	10.9	16.5

Table 2. New York-Oklahoma Monthly Average Cotton Basis (cents/lb.)

		July Contract			
	Avg.	High	Low	Optimistic	Pessimistic
August	18.0	22.6	13.0	15.6	20.3
September	16.3	23.7	12.1	13.8	18.7
October	16.9	20.0	11.5	14.5	19.2
November	15.9	18.6	11.8	13.6	18.2
December	17.0	19.6	12.2	14.7	19.3
January	18.5	21.2	14.1	16.6	20.4
February	17.8	21.9	13.3	15.7	20.0
March	15.9	21.6	11.3	13.9	17.9
April	15.1	18.5	9.7	17.7	12.5
May	13.7	20.7	8.7	11.2	16.3
June	11.0	15.4	1.0	8.4	13.6
July	12.7	19.9	9.0	9.2	16.1

Table 3. New York-Oklahoma Monthly Average Cotton Basis (cents/lb.).

		December Contract			
	Avg.	High	Low	Optimistic	Pessimistic
January	18.6	24.2	6.9	12.4	24.9
February	16.9	23.5	6.3	10.3	23.5
March	17.4	21.8	5.7	12.4	22.4
April	16.8	22.1	8.6	12.1	21.6
May	14.4	20.8	6.8	9.9	18.9
June	12.3	20.3	- 2.7	7.7	16.9
July	14.1	17.7	7.9	11.5	16.7
August	13.3	23.0	7.6	10.4	16.2
September	11.9	24.2	8.0	8.5	15.3
October	13.5	22.0	8.7	10.2	16.9
November	11.7	13.2	10.5	10.9	12.5
December	12.2	17.0	4.3	8.8	15.6

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