

A REGIONAL COMPARISON OF U.S. COTTON BASIS PATTERNS

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Abstract

The basis, defined as the cash price minus the futures price, is important when making marketing decisions. The cotton basis is calculated using the July futures price for six major cotton marketing regions in the U.S. for August 1993 to November 1997. Graphs of the average basis for the four complete crop years show that the basis generally followed the expected seasonal pattern. The basis tended to be weakest at harvest and to strengthen later in the crop year. However, a visual inspection showed regional differences in the seasonal pattern. Regional differences in the yearly variability in the basis were also observed. Thus, the usefulness of the average historical basis in predicting the future basis appears to differ depending on the region.

Introduction

The purpose of this paper is to determine the general pattern of the cotton basis for the different marketing regions within the U.S. The general seasonal pattern is determined for each region by averaging the monthly basis over several crop years. The regional bases are compared graphically. The seasonal pattern for each crop year is also examined to obtain insight regarding the usefulness of a regional cotton basis table for basis predictions.

What is the Basis?

The basis, defined as the cash price minus the futures price, is important for many types of marketing strategies for cotton. Often in the cotton trade, prices for both spot and deferred delivery transactions are quoted in terms of the basis. For example, on November 8th, a merchant may bid 72 cents per pound for base quality cotton when the December New York cotton futures price is 75.20 cents per pound. In that case, the basis is 3.2 cents under, ($72.00 \text{ cents} - 75.20 \text{ cents} = -3.2 \text{ cents}$). In the cotton marketing trade, the basis of 3.2 cents under is usually referred to as 320 points under or simply "320 under". Often, a merchant quotes his bid as the basis rather than as the spot price. In this case, the merchant's bid would be 320 under December futures. When the spot price is greater than the futures price, the basis is quoted as the number of points over. The basis is said to *strengthen* when the spot price rises relative to the futures price, say, when the basis moves from 320 under to 290 under. The basis *weakens* when the spot price

falls relative to the futures price. The average historical basis is the average basis at a particular time and place over several marketing years. When the local basis is stronger than the historical average (e.g., at 320 under when the historical relationship has been 450 under), it indicates a local need for cotton, and buyers are bidding a higher price than usual to encourage growers to sell.

Uses of the Basis

Good basis predictions are useful in decision making. In particular, they are useful in decisions regarding cash contracting and whether to hedge crop sales on the cotton futures or options market.

A basis is locked-in when a producer enters a contract that fixes the cash price. For example, if a producer in August is offered a cash contract for delivery in November at 71 cents per pound and the current December futures price is 77 cents per pound, a basis of 600 under is implied. A grower can compare the current basis offered for deferred delivery in his market to the average historical basis for that market. If this current basis for deferred delivery is substantially below the historical basis (e.g., 200 under), then the local market is weak relative to its typical level. One should note that a merchant incurs costs and risks when entering a forward contract with a producer. Thus, the basis offered in a cash forward contract may be discounted relative to the expected basis.

Basis estimates are also useful for producers hedging in the futures market. A farmer in May who wants to lock-in a price in November using the December futures contract must also consider the basis. If this farmer wants to make at least 69 cents per pound on her cotton and the December futures is 71 cents in May, locking in this price seems reasonable. But if her local basis is historically 400 under in November, she is locking in an estimated price of 67 cents per pound (calculated as $71 \text{ cents/lb.} - 4 \text{ cents/lb.}$). The basis needs to be 200 points stronger than the historical average to achieve the targeted 69 cents. Similarly, growers planning to store hedged cotton must consider the basis for the month in which they plan to sell.

Trading in cotton options provides producers with an alternative to fixed price contracting and hedging as a means of forward pricing their cotton. Buying put options allows producers to establish a minimum price for their cotton without foregoing gains from higher cash prices. Basis information is needed to evaluate forward pricing via options trading since the options are on futures rather than physical commodities.

Spot Price Data

Typically, the basis is calculated using daily spot prices collected from specific trading locations. A basis table, constructed for each of these locations through time,

provides an estimate of the historical basis at each location for buyers and sellers who transact at that point. Basis tables are often available at major elevator points for wheat, soybeans, and corn. In South Carolina, the Clemson University Cooperative Extension Service publishes basis tables for these commodities at thirteen elevator locations (Curtis and Miller). However, cotton basis tables are rarely published because cotton spot prices are generally not collected for specific locations.

Before August 1988, USDA's Agricultural Marketing Service (AMS) reported daily cotton spot prices at various cities. However, since then, AMS has reported daily spot prices for seven marketing regions in the Cotton Belt. During the period analyzed here, the reported prices are identical for the North Delta and the South Delta regions. Therefore, in this paper, the following six regions are used:

- 1) Southeast (Alabama, Florida, Georgia, North Carolina, South Carolina and Virginia)
- 2) Delta (Missouri, Tennessee, Arkansas, Louisiana and Mississippi)
- 3) East Texas-Oklahoma
- 4) West Texas
- 5) Desert Southwest (Arizona, California, western and central New Mexico, and the El Paso area of Texas)
- 6) San Joaquin Valley

When AMS began reporting regional spot prices, an attempt was made in North Carolina to collect spot price data at several North Carolina and South Carolina sites. This attempt eventually failed because some buyers were reluctant to report bids for confidentiality reasons.

AMS reports prices for base quality cotton, (color 41, leaf 4, staple 34, mike 3.5-3.6 and 4.3-4.9, strength 23.5-25.4 grams per tex), and premiums and discounts for each official grade, leaf, staple, and mike quoted in the market. Area reporters collect information on prices paid for cotton of different qualities within each region. The prices are compiled and adjusted to represent the average compressed, FOB car/truck spot price within a designated region (Larson and Meyer). Therefore, the prices represent the value of cotton loaded on a train or truck having passed through a warehouse facility. If a reporter collects price data on cotton sold compressed in the warehouse, the data are adjusted for warehouse outhandling charges before being reported.

Calculating the Basis

The basis is calculated for each region for each month, August 1993 to November 1997. Given that USDA defines the cotton crop year as August 1 through July 31, the data represent the four most recent complete crop years and several months of the current crop year. (Cotton basis data are available from the authors.)

The basis is calculated using monthly averages of spot prices for base quality cotton for each designated region, published by USDA-AMS in their monthly *Cotton Price Statistics*. Given that the spot prices are regional averages, the calculated basis is also a regional average and may not provide an accurate basis estimate at a particular location within the region. One would not expect the error to be large for a geographically similar region such as West Texas. However, the error may be substantial for a geographically diverse region such as the Southeast. For example, if most trading on a particular day occurred in Georgia, the basis for the Southeast region would essentially reflect the Georgia basis. As a result, the regional basis may be a poor estimate of the actual basis in a distant location in North Carolina with lighter trading.

The futures prices used in the basis calculations are monthly averages of the daily settlement prices for the July cotton futures contract traded on the New York Cotton Exchange. In practice, the basis is usually calculated using the nearby futures contract. However, the purpose of this paper is to examine basis patterns across the six marketing regions, and calculating basis from one futures contract simplifies that task. The July contract was chosen to avoid changing the futures contract used in basis calculation within a crop year.

Seasonality of the Historical Basis

In general, the spot price for a storable commodity, like cotton, would be expected to follow a seasonal pattern. The spot price would be expected to decline during the harvest period, reaching its lowest level during the period of major harvesting. The price would increase during the crop year because of storage costs and then fall again as the new crop becomes available.

The basis is expected to follow a similar pattern because it represents the difference between the spot price and a particular futures price. The spot price represents the value of cotton at a particular time and location. The futures price is an estimate of what the value of cotton will be at the maturity of the futures contract. Near harvest, when many bales of cotton are marketed, supply is great, so the near-harvest spot price would be expected to fall relative to the expected supply and demand conditions in July represented by the July futures price. In other words, the basis would get weaker. As the crop year continues, the spot price would rise relative to the futures price and the basis would strengthen as the futures contract nears maturity. At contract maturity, the basis approaches zero for the par delivery point (Leuthold, Junkus, and Cordier).

To determine this pattern empirically, the monthly cotton bases are averaged over the four complete crop years (1993/94 - 1996/97) for each region. In general, the basis for the Delta region follows the expected pattern (Figure 1). The basis weakens from August until November, and slowly

strengthens until it is approximately equal to zero in July when the futures contract expires.

Figure 2 shows the basis for the Southeast and San Joaquin Valley regions, as well as the Delta basis. Of the six marketing regions, these three have the strongest bases during this study period because of their proximity to domestic mills and/or major ports for export. At the beginning and ending of the marketing year, the basis is approximately equal in all three regions. The Southeastern basis and the Delta basis are similar throughout the whole year. However, the San Joaquin basis quickly becomes stronger than the other two as the marketing year progresses, particularly from October through April. This difference can probably be attributed to the different marketing outlets for the cotton from these regions. During the 1992/93 marketing year, 97.4 percent of Southeast cotton and 75.3 percent of Delta cotton went directly to domestic textile mills in the Southeast. Twenty-eight percent of western cotton flowed to Southeast mills while the remainder was exported (Glade). Presuming the 1992/93 cotton destinations are typical, the San Joaquin cotton price is more affected by export market conditions and Southeast and Delta cotton prices are more affected by domestic mill conditions. The different market outlets may also explain the different patterns observed between February and May. During those months, the basis weakened in the San Joaquin Valley while the Southeastern basis continued to strengthen. The weakening of the San Joaquin basis may be reflecting the increased competition that San Joaquin cotton faces from Southern Hemisphere producers competing for sales in the Pacific Rim.

Figure 3 shows the basis for the East Texas-Oklahoma, West Texas, and Desert Southwest regions. These three regions have the weakest basis because they incur larger transportation costs to move cotton to domestic mills or export ports. West Texas and East Texas-Oklahoma have basis patterns that nearly match each other. The Desert Southwest basis tends to be weaker at the beginning of the marketing year, stronger in the middle, and weaker again at the end. Again, the different marketing outlets for these regions may explain the different basis patterns observed.

In general, the average basis followed the expected pattern during the recent four crop years. The basis was weakest around harvest and generally strengthened as the July futures contract expiration approached. However, some differences in the pattern were observed across regions, with the expected pattern being less apparent in regions more dependent on export markets.

Basis Variability Across Crop Years

Given that the basis follows a seasonal pattern, the average monthly basis may provide a starting point for predicting the basis in the next crop year. However, much yearly volatility in the basis can be obscured in averages. Therefore, basis

data for each crop year are reviewed to provide some indication of basis variability.

Figures 4 through 6 show the basis for three marketing regions for each crop year, 1993/94 through 1996/97. Given the similarity of the yearly basis pattern for the Southeast and Delta regions, only the Southeastern basis is shown here (Figure 4). The Southeast basis shows more variability at the beginning and the end of the crop year, with less variability from October to February. For example, in August and in June, the difference between the strongest and the weakest basis during those four crop years (called the range) was greater than 1000 points. However, in February, the range was 338 points. Thus, the basis was more stable (and appears to be more easily predictable) in these middle months. This pattern is possibly the result of harvest uncertainty early in the crop year, a good knowledge of supplies in the middle of the crop year, and uncertainty about the new crop late in the crop year. Thus, early or late marketing year trading decisions would require more intensive analysis of current market conditions to predict the basis.

The West Texas basis also shows more variation at the beginning and end of the crop year and less variation in the middle months (Figure 5). (The basis for the East Texas-Oklahoma region is similar and is not shown.) However, the basis shows little variation at the end of the crop year if the 1994/95 crop year is excluded. In the other three crop years, the cotton basis approached zero as the July futures reached expiration. Given that only four crop years are analyzed here, each year is weighted 25%. The 1994/95 crop year was unusual, with cotton futures prices reaching record highs and the basis being unusually weak at the end of the marketing year for all regions. If that year is actually an outlier, then its influence is overstated throughout this paper affecting the conclusions drawn.

The yearly variation in the basis in the San Joaquin Valley and in the Desert Southwest region was similar. Thus, only the basis for the San Joaquin Valley is shown here (Figure 6). The basis in both regions showed more variation across the four crop years than the basis in the other regions, with variability in the San Joaquin region exceeding that in the Desert Southwest. In several months, the range of the basis in the San Joaquin Valley was close to 2000 points. In addition, the variation in the basis in these two regions did not decrease during the middle of the crop year as in other regions. These regions, and particularly the San Joaquin Valley, may have more variability in the basis from year to year because of their dependence on export markets. Cotton exports have been far more variable than domestic mill use of cotton. Given the large variation in the basis from year to year, the historical average basis will probably be a poorer predictor of the future basis for these two regions than for other regions. Here, one must consider local market conditions before making basis predictions.

Usefulness of the Historical Basis in Predicting the Basis For This Crop Year

As stated above, the average historical basis can be used as a starting point to predict the basis. One can obtain some insight into the reliability of this technique by comparing the actual basis to the historical basis. In Figures 7 and 8, the actual basis for August through November 1997 is compared to the average basis from the previous four crop years for the Southeast and West Texas regions, respectively. The basis has been weaker than average in both regions, but has become close to the average basis in November. As indicated above, in the last four crop years, the basis in both regions has shown more variability in the early months of the crop year and less variability during the middle months. Thus, despite weakness in the basis early in this crop year, past basis behavior implies that the basis will be close to the average basis through the spring of 1998.

Conclusions

The basis is important for members of the cotton industry in making informed marketing decisions. In this paper, the cotton basis was calculated for six major cotton marketing regions using the July futures prices. The basis was calculated for regions instead of specific sites because site-specific spot prices are not available. The regional bases for August 1993 to November 1997 were compared graphically. Thus, only four complete crop years were analyzed.

In general, the average basis followed the expected seasonal pattern of being weakest around harvest and strengthening during the remainder of the crop years. However, differences in the seasonal pattern were apparent across regions. In particular, the expected seasonal basis pattern was less evident in regions that marketed most of their cotton abroad. In addition, regional differences in the yearly variability in the basis were observed. The basis showed more variation from year to year for regions dependent on exports. Thus, the usefulness of the average historical basis in predicting the future basis appears to differ depending on the region.

References

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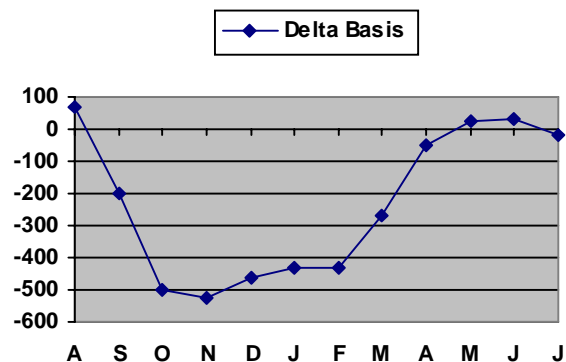


Figure 1. Monthly average Delta cotton basis in points, August 1993-July 1997.

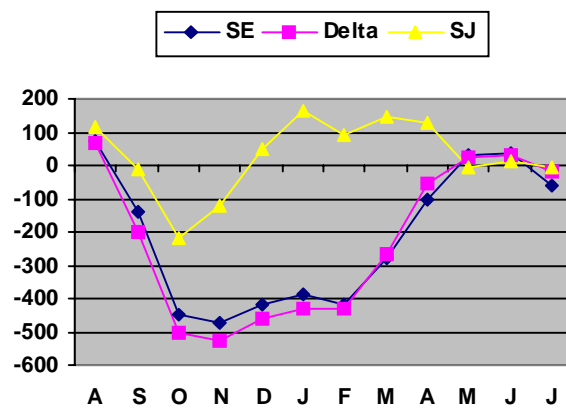


Figure 2. Monthly average Southeast, Delta, and San Joaquin Valley regional cotton basis in points, August 1993 - July 1997.

Where
 SE - Southeast
 Delta - north Delta and south Delta
 SJ - San Joaquin Valley

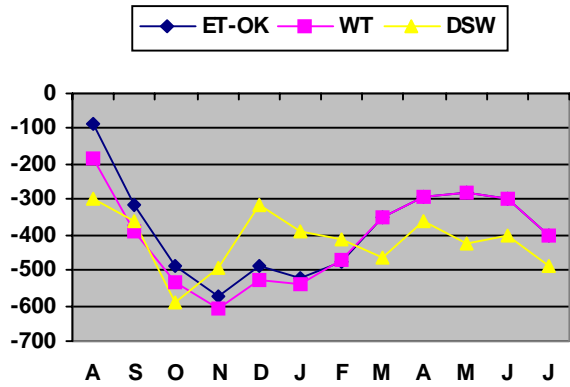


Figure 3. Monthly average East Texas-Oklahoma, West Texas, and Desert Southwest regional cotton basis in points, August 1993-July 1997.

Where

- ET-OK – East Texas – Oklahoma
- WT – West Texas
- DSW – Desert Southwest

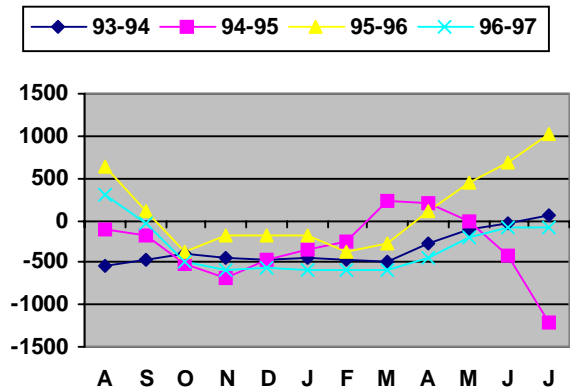


Figure 4. Southeast monthly basis in points for each crop year, 1993/94 – 1996/97.

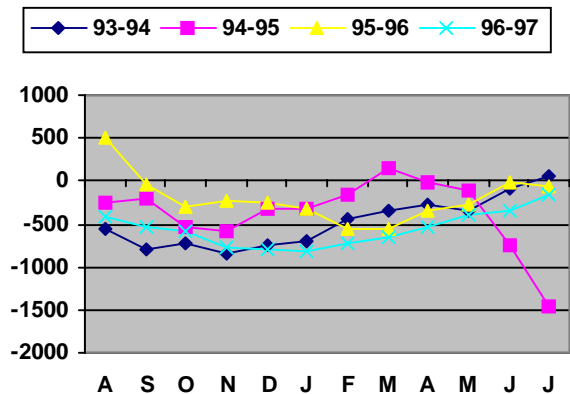


Figure 5. West Texas monthly basis in points for each crop year, 1993/94 – 1996/97.

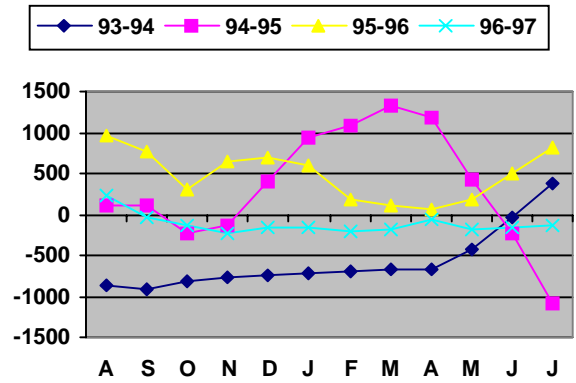


Figure 6. San Joaquin Valley monthly basis for each crop year, 1993/94 – 1996/97.

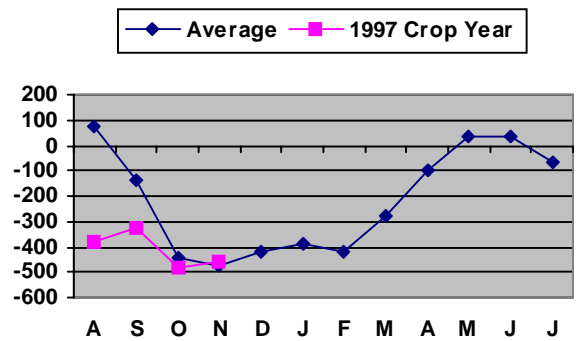


Figure 7. Current crop year monthly basis in points compared to the previous four-year average monthly basis in the Southeast.

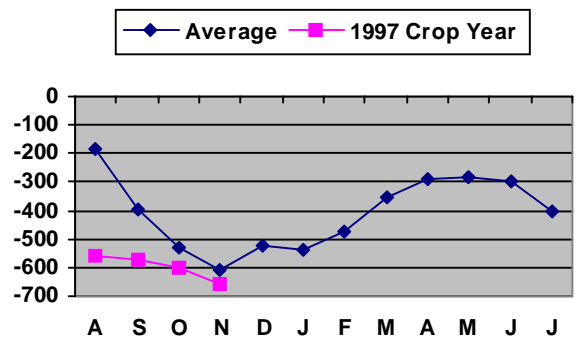


Figure 8. Current crop year monthly basis in points compared to the previous four-year average monthly basis in West Texas.