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## Selected Survey Results

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# Cotton Producers' Use of Alternative Marketing Strategies: Selected Survey Results

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## Introduction

Changes in farm legislation that occurred in 1996 have instigated a renewed interest in risk management and marketing alternatives available to agricultural producers. Abandonment of the target price/deficiency payment programs of the 1980s and early 1990s has focused attention on the use of hedging through futures/options and use of crop insurance as methods for producers to control for price, revenue, and yield risk.

Previous studies of hedging behavior on the part of producers have primarily been focused on grains in the Midwest (Asplund, Forster, and Stout; Goodwin and Kastens; Goodwin and Schroeder), with Coble et al. the only recent study with any focus on cotton. In this vein, we initiated a survey of cotton producers across the U.S. to ascertain their use of various marketing strategies. The purpose of this paper is to describe the basic results from that survey and provide some insight into the use of various marketing alternatives.

## Survey Development

Previous empirical studies revealed the importance of operator characteristics in explaining marketing behavior. Therefore, the first part of the questionnaire was designed to generate data on some background characteristics of producers and their farm operations, such as producer age, education, experience, and extent of marketing training, as well as farm size and share-rental arrangements. This section also included a set of questions eliciting producers' past marketing practices, namely marketing strategies used in 1990-1995 and 1996-1998. These periods were defined in order to examine how marketing practices were affected by 1996 Farm Bill. The producers were also asked to indicate if they had increased the share of their cotton production that they hedged since the 1996 Farm Bill.

The second part of the survey was devoted to the farm characteristics in 1999. It generated data on acreage devoted to cotton and other crops in 1999. These data — along with the information on percentage contribution of different farm enterprises to gross farm income — are intended to give an indication of the degree of diversification on the farm. Following the approach to hedging as a financial decision, this section also contained questions on the financial characteristics of the farm operations managed by the participant of the survey, such as the market value of the farm's assets, amount of long-term and short-term debt, and gross farm income. Musser, Patrick, and Eckman pointed out the importance of comparing current income with the average for the previous several years in order to measure the decrease in risk aversion associated with a loss position. Therefore, producers were asked how their 1999 gross farm income compared with the average of the previous 3 years.

Off-farm income and investments of the farm family members may reduce the income variability of the entire household. However, if this off-farm income is related to agricultural activities, the diversification effect from the alternative sources of income could be diminished. Hence, this section also contained questions about the amount of off-farm income and/or investments of the entire household and what percentage of off-farm income was related to agricultural activities.

Finally, this section contained questions pertaining to the marketing strategies used by farmers in 1999 before harvest and at or after harvest. If producers indicated that they used futures and/or options, they were also asked to specify what types of contracts they bought and/or sold, whether they constructed any hybrid positions, and whether they had a net long position in

futures/options at any time during the growing period. We asked this set of questions to determine whether producers were using futures/options markets for speculation or for hedging purposes. Producers were also asked about their hedging frequency in 1999 in order to investigate whether marketing information sources had any effect on the producer hedging patterns (as hypothesized by Irwin et al.).

The third part of the survey related to producer expectations for the 2000 crop year. This section contained some questions about expected crop acreage and marketing strategies consistent with information elicited for 1999. This section also contained a set of questions about cotton yield, cash, and futures price expectations for 2000. Following Coble et al., these questions were asked in a manner not to derive the extreme points of distributions, but to assess their most likely values along with the upper and lower 10th percentiles. This method was used in this study because Keefer and Bodily demonstrated that it yields a more efficient approximation of distribution characteristics than a traditional method of using extreme values.

The fourth part of the survey related to issues of risk assessment and risk aversion. The producers were asked to self-rate their willingness to take risks relative to other farmers on a 1-10 scale. Although self-assessment has been argued to be an ineffective measure of risk aversion (because respondents may tend to reflect desirable rather then actual characteristics), other measures of risk aversion possess similar drawbacks, and no measure of risk aversion has been demonstrated to be objectively superior to others. Producers also were asked to indicate a primary source of risk (yield, price, or other) faced by their farm. Another set of questions related to a risk-return tradeoff acceptable for producers. Farmers were asked if they would be willing to accept a lower price to reduce their income variability, and what percentage of the price they would be willing to give up to reduce price variability by 50%. It is hypothesized that a higher degree of risk-return tradeoff is indicative of higher risk aversion.

Previous literature (e.g., Shapiro and Brorsen; Simmons; McNew and Musser) indicated the importance of producer perceptions of market efficiency. Question 4 of this section elicited the farmer's opinion about the relationship between planting time futures and harvest time cash prices. Additional information on producer perceptions of market efficiency can be derived from cash and futures price expectations at harvest from the previous section.

The following set of questions related to market information sources used by producers. These questions were asked to determine which sources of information were most important for farmers and whether these sources affected producers' hedging patterns as hypothesized by Irwin, Jackson, and Good. This section also contained questions about indirect transaction costs of hedging, such as manager's time and money allocated on collecting market information. Producers were also asked to indicate if they were members of marketing cooperatives; in this case, marketing through a cooperative is essentially a delegation of the marketing function to the cooperative by the producer.

Interactions between crop insurance and hedging were studied by Coble, Heifner, and Zuniga. This survey contained a set of questions about producer purchases of additional crop insurance above the minimal catastrophic coverage in order to examine these interactions for the sample of American cotton producers.

Previous literature also discussed the benefits of a "natural hedge" enjoyed by producers in major production areas. In order to measure these impacts in the current survey, producers were asked about their expectations of the price change in response to a 30% yield failure on their farm. It is hypothesized that farms located in the major production areas would demonstrate strong negative correlation between yield and price, which is indicative of the "natural hedge" phenomena.

The effect of changes in the loan rate on hedging was analyzed in the next set of questions, which elicited the share of crop the producers would hedge at different loan-cash price combinations. The quality characteristics of the crop and the degree of quality variation across bales may contribute to basis risk and were examined in the following set of questions.

Because some previous studies (Musser, Patrick, and Eckman) indicated that hedging behavior might be affected by some noneconomic variables, a set of Likert-scale questions was included in the last section to test producer attitudes toward futures and options markets. This section contained 17 questions, which may be divided into statements supporting the use of futures, statements discouraging the use of futures, and selected statements about marketing practices. This section was intended to derive some information about arguments used to justify relationships in previous empirical and theoretical studies (e.g., lender requirements to study risk-balancing hypothesis of hedging).

# Survey Results

The survey was administered throughout the cotton-growing states of the U.S. The "Cotton Belt" includes Alabama, Florida, Georgia, North Carolina, South Carolina, Virginia, Arkansas, Louisiana, Missouri, Mississippi, Tennessee, Kansas, Oklahoma, Texas, Arizona, California, and New Mexico.

Altogether, 3,500 surveys were mailed out during spring and early summer of 2000. About 51 surveys were returned with incorrect addresses, which resulted in a sample size of 3,449 producers. After a three-stage mail-out, 244 responses were received, which corresponds to a response rate of about 7%. Responses from 69 respondents were eliminated from the sample because they reported that they did not plant cotton in 1999. Thus, 175 questionnaires were used for the analysis. The following sections will concentrate on the findings from this survey.

The response rate of 7% may be considered low. However, the general characteristics of the farmers and farm operations described below are similar to the ones reported in the previous studies based on random samples (Asplund et al.; Goodwin and Schroeder) and the national averages from the 1997 Census of Agriculture. We recognize the potential for a presence of nonresponse bias. The test for a nonresponse bias is described in the following section.

## *Analysis of Nonresponse Bias*

The use of a direct mail survey introduces the potential problem of nonresponse bias or error. Nonresponse bias refers to systematic differences between characteristics of survey respondents and nonrespondents. The larger the bias, the more caution the researcher should exercise in generalizing results of the respondent sample to the entire population (Ratneshwar and Stewart).

According to Ratneshwar and Stewart, one of the more commonly used approaches for the assessment of nonresponse bias is the "wave" technique. Here, respondents of the second wave (or follow-up) of the survey instrument are compared with respondents of the first wave of the survey instrument along demographic variables of interest. If there are no significant differences between the two groups, then an absence of nonresponse bias is assumed. This assumption is based upon the logic that respondents of the second wave are similar to those in the population that did not respond to either wave, because these respondents themselves were actually nonrespondents to the first wave.

The wave technique was employed in this study to test for nonresponse bias. Respondents to the follow-up mailing from Mississippi were compared with respondents to the initial mailing from the same state. This test was based on Mississippi data because there was not sufficient data from the second mail-out to conduct this test for other states. The two groups were compared using a two-sample t-test for means assuming equal variances. The results of this procedure are reported in Table 1.

As shown in Table 1, there is no statistical difference between the respondents to the initial mail-out and the respondents to the second mail-out among the selected variables. As such, the respondent group is considered to represent adequately the population of

**Table 1. Analysis of nonresponse bias.**

| Variable | T-statistic | Level of significance (two-tail) | Degrees of freedom | Statistically different |
|---|---|---|---|---|
| Total acres | -0.7879 | 0.4400 | 10 | no |
| Acres owned | -0.9038 | 0.3768 | 10 | no |
| Market value of assets | -0.6072 | 0.5505 | 10 | no |
| Percent crop sold for cash | -0.1423 | 0.8883 | 10 | no |
| Percent crop sold through a pool | -0.8214 | 0.4211 | 10 | no |
| Percent crop sold by forward contracts | 0.7100 | 0.4859 | 10 | no |
| Percent crop priced by futures | 1.2452 | 0.2275 | 10 | no |
| Percent crop priced by options | 0.5320 | 0.6006 | 10 | no |

cotton producers in Mississippi. Unfortunately, there is not enough data to conduct this test in other states. For the purpose of this analysis, it is assumed that there is no nonresponse bias in other states as well. However, if this bias were present, it would probably inflate the estimates of producer hedging. Because the nonresponse bias is probably caused by the lack of interest of the participants to the subject of the survey, it is likely that nonrespondents are the producers who do not hedge. Therefore, in the presence of nonresponse bias, the hedge ratios for the population would likely be lower than the hedge ratios for the sample of respondents.

## Background Data

Figures 1-3 provide frequency distributions for several general characteristics of the respondents. Figure 1 describes farmers' ages. The average age of the participants of the survey is 50.5 years. This is similar to the participants of Asplund et al.'s survey (51 years) and to the national average (54.3 years) as reported by 1997 Census of Agriculture. The distribution of farmers' ages is skewed to the right with 41% of respondents in the 46-60 age group, 30% in the 36-45 age group, and 21% in the 60 and older age group. According to Figure 2, about 55% of farmers received a college education. The survey revealed that 76% of producers had more than 20 years of farming experience, and 44% of farmers attended at least some sort of marketing training with an average of 14.2 hours of various educational programs on alternative pricing mechanisms to market agricultural commodities during the last 10 years. According to Figure 3, the majority (about 70%) of the farmers who attended market education programs attended less than 5 hours of such training.

In 1999, farm operations had an average of 1,459 acres of land, 38% of which was owned by the producer. Figure 4 depicts the market value of farm assets of the sample farms. These farm operations had an average market value of farm assets of $837,000, with about 40% in the $100,000 to $599,999 category. These were relatively large farms compared with national averages across all farms of 487 acres of land per farm and $507,426 of market value of assets (1997 Census of Agriculture).

Long-term debt comprised, on average, 18% of the market value of farm assets (i.e., the debt-to-asset ratio was equal to 0.18, on average). About 37% of farm operations had long-term debt less than 20% of the market value of farm assets; about 48% had long-term debt between 20% and 60% of market value. Short-term debt

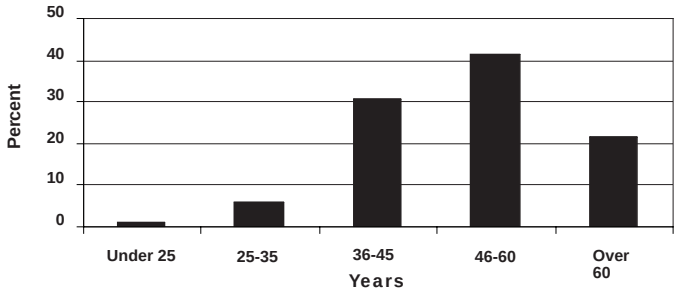


**Figure 1. Age of producers.**

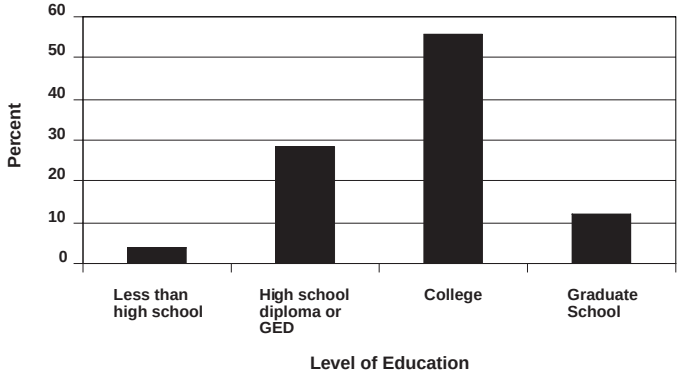


**Figure 2. Producers' level of education.**

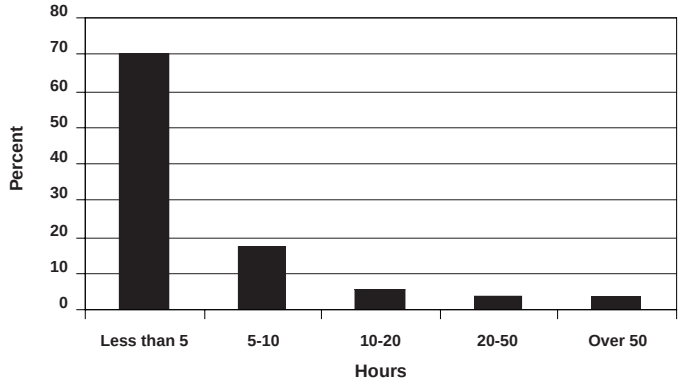


**Figure 3. Hours of marketing training attended by producers.**

represented an average of 46% of farm operating capital, suggesting that about half of all operating capital was derived from debt sources, on average. About 24% of farm operations had short-term debt less than 20% of operating capital; 27% had short-term debt more than 80% of operating capital. These debt levels are lower than debt/asset ratios reported in the previous studies (27.7% in Asplund et al., and 41% in Goodwin and Schroeder). The respondents to this survey had an average gross farm income of $405,555. However, 37% of these farms had gross farm income of less than $200,000 (Figure 5). The participants of the survey also indicated that their gross farm income in 1999 was, on average, slightly lower than the previous 3 years (2.42 points with 2 = lower, and 3 = same). According to Musser, Patrick, and Eckman, this lower income may be indicative of a certain decrease in risk aversion associated with a loss position.

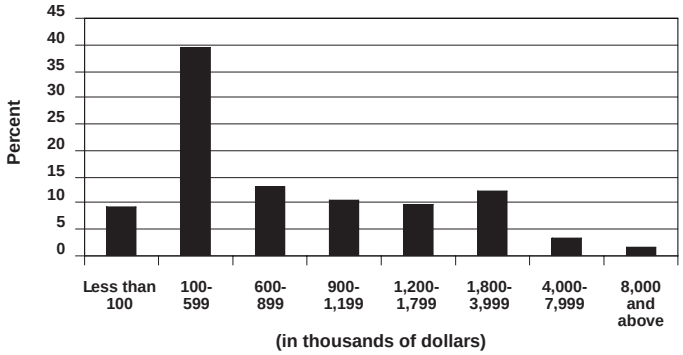


**Figure 4. Market value of farm assets.**

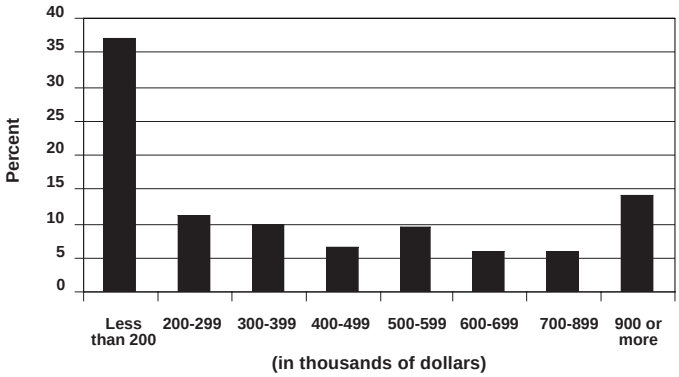


**Figure 5. Frequency distribution of gross farm income.**

## *Marketing Strategies Used*

Table 2 summarizes the percentages of surveyed producers using selected marketing methods for the periods 1990-1995, 1996-1998, 1999, and 2000. Data for 2000 reflect farmers' expectations for the 2000 season. These data demonstrate that the use of cash sales and forward contracts tended to decrease through time, while marketing pools and direct hedging with futures and options were becoming more frequently used. In 1999 and 2000, marketing through a pool became a more prevalent method of marketing cotton (52.1% in 1999 and 58% in 2000). The popularity of pools was also reflected in high membership levels. About 58% of respondents indicated that they were members of marketing cooperatives. Pools were followed by cash sales (41.3% for 1999 and 36.4% for 2000) and forward contracting (32.3% in 1999 and 27.8% in 2000). Direct hedging with futures and options was much less common. However, the use of these methods grew substantially in percentage terms since 1990 — from 0.04% to 8.6% for futures and from 0.03% to 11.1% for options. It should be noted that the use of various marketing strategies adds up to more than 100%, which indicates that producers have used some combinations of these strategies (e.g., cash sales and hedging).

**Table 2. Marketing strategies used (do not include postharvest strategies).**

| Strategy used | 1990-95 | 1996-98 | 1999 | 2000 |
|---|---|---|---|---|
| | % | % | % | % |
| Cash | 57.4 | 49.37 | 41.3 | 36.4 |
| Pool | 34.2 | 48.73 | 52.1 | 58 |
| Forward | 39.4 | 37.34 | 32.3 | 27.8 |
| Futures | 0.04 | 0.06 | 7.2 | 8.6 |
| Options | 0.03 | 0.06 | 9 | 11.1 |
| No. of observations | 155 | 158 | 167 | 162 |

Similar trends can be observed in average shares of cotton sold using selected marketing strategies (Table 3). Cash sales and forward contracts comprised a smaller share of cotton priced through time, while marketing through a pool and direct hedging were gaining importance. However, the changes in the use of alternative marketing strategies were less pronounced, which indicates that even though more people were trying new marketing techniques, they tended to price relatively smaller shares of their crop with these techniques. Consistent with the use of alternative marketing strategies, average shares of cotton priced demonstrated the dominance of marketing through a pool (52.55%), followed by cash sales (24.79%), forward contracting (18.4%), and direct hedging with options (5.86%) and futures (2.33%) expected in 2000.

**Table 3. Average shares of cotton priced using selected marketing strategies.**

| Strategy used | 1990-95 | 1996-98 | 1999 | 2000 |
|---|---|---|---|---|
| | % | % | % | % |
| Cash | 43.02 | 33.12 | 32.1 | 24.79 |
| Pool | 31.40 | 43.49 | 47.77 | 52.55 |
| Forward | 22.68 | 21.30 | 23.82 | 18.40 |
| Futures | 1.52 | 2.31 | 2.47 | 2.33 |
| Options | 0.39 | 1.70 | 4.52 | 5.86 |
| No. of observations | 155 | 158 | 167 | 162 |

The use of direct hedging found in this survey was significantly lower than in most of the previous empirical studies. However, it was consistent with the two studies that used a random sample of producers (Asplund et al.; and Goodwin and Schroeder). Table 4 demonstrates that the findings of this study are consistent with those found by Goodwin and Schroeder. Table 4 presents hedge ratios for subsamples of producers who use respective methods following Goodwin and Schroeder. Examination of the time trends in the use of various marketing strategies revealed that average percentages of cotton sold in the cash market, using marketing pools and forward contracts, were consistent in the last 10 years.

However, there was a significant increase in the proportion of the crop priced using options (from 15% in 1990-1995 to 50.95% in 2000) and a relative decrease in the proportion of the crop priced using futures (from 39% in 1990-1995 to 28% in 2000) for those producers using futures and options. These trends indicate that although the use of both futures and options increased in the last 10 years, the users of these techniques were moving away from futures pricing toward options pricing. One of the possible reasons for this movement could be associated with margin calls on futures, as 45% of respondents indicated that margin calls on futures created a cash problem for them (discussed later).

Alternatively, futures and options markets could be used for speculation. Survey respondents indicated that in 1999 they priced 2.45% of their crop in futures and 4.5% of their crop in options markets at or after harvest. These figures may include farmers who practiced a storage hedge as well as those who were speculating (e.g., an uncovered call). About 11% of respondents indicated that at some time during the growing period in 1999, they had a net long position in the futures/options market, which is indicative of speculative behavior. Seven percent indicated that they constructed

**Table 4. Average percentage of cotton sold by alternative marketing methods (for subsamples of producers using the respective method).[1]**

| Strategy used | 1990-95 | 1996-98 | 1999 | 2000 |
|---|---|---|---|---|
| | % | % | % | % |
| Cash | 74.44 | 66.67 | 77.56 | 67.77 |
| | (89) | (78) | (70) | (60) |
| Pool | 91.23 | 89.23 | 91.14 | 90 |
| | (53) | (77) | (87) | (94) |
| Forward | 57.62 | 57.03 | 71.90 | 65.82 |
| | (61) | (59) | (55) | (45) |
| Futures | 39.17 | 36.5 | 34.17 | 27.79 |
| | (6) | (10) | (12) | (14) |
| Options | 15.00 | 26.8 | 50.70 | 50.95 |
| | (4) | (10) | (15) | (19) |

[1]Numbers in parentheses reflect numbers of observations.

some hybrid positions, which could also have been used for speculation. In addition, about 10% of producers indicated they bought some put contracts in 1999, and about 13% said they bought call contracts. Considering that put-call fences are rather sophisticated techniques, the majority of the 13% who purchased call options in 1999 were likely speculating, although these data are not direct evidence of speculative behavior.

In 1999, about 10% of producers sold futures and 7% bought futures. Cotton producers participating in the survey placed an average of 2.59 hedges and lifted an average of 2.73 hedges in 1999. However, 15.88% of producers reported placing a hedge, while only 8.8% reported lifting a hedge in 1999, which may suggest that producers did not fully understand this question.

## *Alternative Risk Management Strategies*

### Diversification

Hedging is not the only risk management instrument available to farmers; therefore, hedging behavior should be examined in conjunction with other risk management strategies. One of the ways to reduce business risk is to diversify sources of income. Figure 6 shows the shares of various sources of gross farm income in 1999. Although cotton was a primary enterprise on these farms and contributed, on average, 44% to gross farm incomes, other commodities and government payments presented alternative sources of income. Other commodities, including livestock, contributed 29% to gross farm income. Government payments — which included disaster payments, loan deficiency and producer options payments, and AMTA (transfer payments) — contributed a total of 27% to gross farm income in 1999, on average.

Other sources of income that reduce business risk include income of the entire household from off-farm employment and/or off-farm investments. In 1999, the average income of the respondents' households from off-farm sources was $50,411. The average income from the off-farm sources was about 12% of the average gross farm income ($405,555). It is important to note, however, that 14.45% of this off-farm income was related to agricultural activities. This suggests that this portion of off-farm income was tied to the same cyclical movements as on-farm income, thereby potentially dampening its diversification effect.

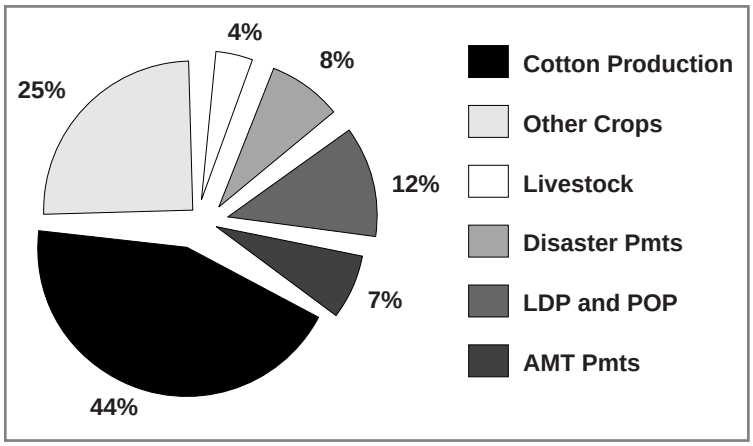


**Figure 6. Shares of various sources of gross farm income in 1999.**

**Table 5. Average acreage of various crops planted.**

| Crop | 1999 | 2000 |
|---|---|---|
| | *acres* | *acres* |
| Cotton | 731.51 | 763.31 |
| Corn | 65.78 | 78.65 |
| Soybeans | 218.59 | 183.18 |
| Grain sorghum | 106.36 | 72.08 |
| Other (including idle or CRP) | 303.06 | 337.15 |

Another way to measure on-farm diversification is to examine the crop mix. Table 5 depicts average acreage of different crops planted on the surveyed farm operations in 1999 and 2000. Although cotton was a primary crop on these farms — comprising about 51.3% of the total acreage planted in 1999 and 53.2% in 2000 — soybeans and other crops represented a significant portion of a total farm crop mix. Soybeans comprised about 15.3% of total acreage planted in 1999 and 12.8% in 2000. Grain sorghum and corn contributed slightly lower shares to total acreage planted. Grain sorghum comprised 7.5% in 1999 and 5% in 2000; corn, 4.6% in 1999 and 5.5% in 2000. Other crops (including idle set-aside land) averaged 21.26% of total acreage planted in 1999 and 23.51% in 2000.

### Government Programs

Previous studies discussed the notion that government programs essentially provided producers a put option in which the land diversion requirements acted as an option premium and the deficiency payment served as an option payoff (Sakong, Hayes, and Hallam). Thus,

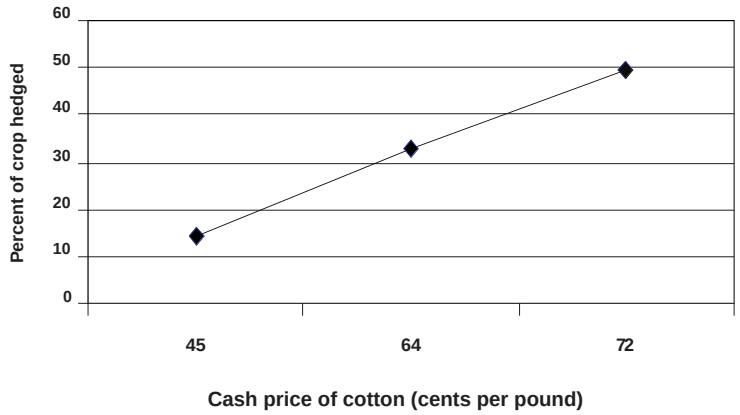


**Figure 7. Levels of hedging at different cash prices.**

government programs provided an effective substitute for hedging. The 1996 Farm Bill changed the provisions of the previous farm programs in an attempt to decouple price support from production decisions. However, only 19% of the respondents of the survey indicated that they have increased the share of their cotton production that they hedged since the 1996 Farm Bill.

Another aspect of government programs discussed by Hanson, Myers, and Hilker is that marketing loan payments effectively truncate cash price realization at the loan rate, while allowing market price to change freely. In this survey, we attempted to analyze the effect of loan rate levels on the producer hedging decisions. The results of this analysis are presented in Figure 7. The survey revealed that if the loan rate was 20 cents below the cash price (e.g., the loan rate 52 cents and cash price 72 cents), cotton producers would hedge, on average, about 50% of their crop. If the loan rate was 12 cents below the cash price (e.g., loan rate 52 cents and cash price 64 cents), cotton producers would hedge, on average, about 33% of their crop. If the loan rate was 7 cents above the cash price (e.g., loan rate 52 cents and cash price 45 cents), cotton producers would only hedge 14% of their crop, on average. This last case — in which the loan rate is above the cash price — is the instance when the government effectively provides a free put option for producers, thereby discouraging hedging. The low hedging levels of 14% reflect this effect.

These data reveal the inverse relationship between hedging levels and the difference between the loan rate and cash price. However, if loan payments were effectively truncating cash price realization at the loan rate (as argued by Hanson, Myers, and Hilker), there would be no hedging if cash price fell below the loan rate, *ceteris paribus*. The 14% observed here may reflect producers who were actually speculating (e.g., buying a call when prices are low) but reporting this activity as hedging. Alternatively, these could be extremely risk-averse producers or producers who do not fully understand that the loan rate provides a free put option and that hedging the crop at these price levels may actually increase their price risk.

## Crop Insurance

Crop insurance is another alternative risk management strategy widely used by cotton producers. About 65% of producers indicated that they had bought (or were planning to buy in 2000) additional crop insurance above the minimal catastrophic coverage required to remain eligible for government program benefits. This number is consistent with the percentage of producers purchasing insurance coverage above the catastrophic coverage level in Texas (64.2%). However, it is much higher than the percentage in Mississippi (11.1%) reported in Coble et al.'s survey. Multiple Peril Crop Insurance (MPCI), which is a yield insurance product, was the most popular type of crop insurance with almost 83% of cotton producers purchasing MPCI in 1999. This figure increased slightly for 2000 with 85% of producers expecting to buy MPCI. Those who bought MPCI in 1999 insured an average 95.5% of their cropland for an average of 64.54% level of coverage. In 2000, users of MPCI expected to insure an average of 95.65% of their cropland for an average of 65.45% level of coverage. This is consistent with the average coverage levels reported in Coble et al.'s survey, which were 78.6% in Texas and 17.8% in Mississippi.

The second most popular insurance product was Crop Revenue Coverage (CRC), which is a revenue insurance product. About 12.6% of respondents purchased additional levels of CRC insurance in 1999; an expected 14.7% purchased additional levels in 2000. Producers insured an average of 73.57% of their cropland in 1999 for an average coverage level of 66.79%. They insured an average of 85.31% of their cropland in 2000 for an average coverage level of 66.88%. These coverage levels are much greater than the ones reported in Coble et al.'s survey summary (9.7 in Texas and 4.9 in Mississippi). This discrepancy could be caused by differences in reporting, because Coble et al. reported percentages calculated using total number of farmers who purchased some type of crop insurance. Conversely, this study included only the farmers who purchased CRC insurance in calculating CRC coverage levels. Other products have been used very rarely, with

only two instances of Group Risk Plan (GRP) purchases in 1999 and one expected case in 2000.

Although crop insurance has been demonstrated to have complementary (yield insurance) and substitute (revenue insurance) features in the previous studies (Coble et al.), 52% of respondents of the survey disagreed with the statement, "Having bought crop insurance makes me less likely to hedge." The average score of responses to this question was 2.65 on a 1-5 Likert scale.

### Market Information Sources

Some researchers (Irwin, Jackson, and Good) argue that marketing advisory services can affect the type and manner in which producers use marketing tools. Because of recommendations received from various marketing advisory services, producers may change the marketing tools that they are using and/or change the frequency with which they market their crop. Table 6 presents how producers rate the average effectiveness of the selected sources of market information. Cotton merchants received the highest average rating (2.61), while university extension personnel received only the fifth highest ranking after farm magazines, peers, and electronic information providers. These ratings agree with the fact that cotton producers market most of their crop using marketing pools and cash markets. These data also suggest that cotton merchants continue to work with producers and provide what is perceived to be valuable information. Farm magazines appear to publish information that 58% of producers deem important in making their marketing decisions. Electronic information providers were also ranked highly (2.25) by cotton farmers.

Other sources of marketing information rated lower than university extension included marketing advisory services, newspaper information on futures markets, commodity brokers, radio/TV commentators, and other sources. The low rating of marketing advisory services may indicate that producers believe that the cost of this source of information is high relative to benefits, or it may simply suggest that cotton producers prefer not to use this source of market information. In addition, as discussed later, 44% of producers disagreed with the statement, "Commodity brokers are acting in my best interests." This response indicates the low level of trust with commodity brokers, which may contribute to the low level of use of futures and options.

Some previous studies discussed the importance of transaction costs in hedging decisions. Besides actual fees and margin calls that producers have to pay to the brokers, opportunity cost of the manager's time and the amount of money spent on collecting market information may also contribute to these costs. Respondents of the survey indicated that it took them, on average, 7.36 hours per month to collect market information. They also reported that they spent, on average, $44.64 per month on collecting market information. These costs should also be considered in analyzing producers' hedging behavior.

**Table 6. Percentage distribution and average ratings of the effectiveness of various sources of marketing information.**

| Sources of information | Very important 4 | Somewhat important 3 | Neutral 2 | Not important 1 | Do not use 0 | Average response |
|---|---|---|---|---|---|---|
| | % | % | % | % | % | |
| Cotton merchants | 19 | 47 | 19 | 3 | 11 | 2.61 |
| Farm magazines | 13 | 45 | 24 | 5 | 14 | 2.38 |
| Peers | 14 | 36 | 29 | 5 | 16 | 2.26 |
| Electronic information provider (DTN, etc.) | 21 | 38 | 13 | 3 | 26 | 2.25 |
| University Extension | 14 | 38 | 21 | 8 | 18 | 2.19 |
| Marketing advisory services | 22 | 28 | 19 | 2 | 28 | 2.14 |
| Newspaper info on futures | 9 | 36 | 28 | 9 | 18 | 2.10 |
| Commodity brokers | 11 | 28 | 27 | 10 | 23 | 1.93 |
| Radio/TV | 5 | 23 | 33 | 20 | 19 | 1.73 |
| Other | 20 | 9 | 17 | 7 | 47 | 1.47 |
| None | 0 | 3 | 12 | 10 | 74 | 0.45 |

### Attitudes toward Futures and Options

Because some previous studies (Musser, Patrick, and Eckman) indicated that hedging behavior might be affected by some noneconomic variables, a set of Likert-scale questions was included to test producer attitudes toward futures and options markets. Table 7 presents a percentage distribution of producer responses to selected questions supporting the use of futures markets. About 78% of producers said they believed that market-timing strategies could increase revenues. However, producers were mostly uncertain whether the use of futures increased their revenues more than the cost of trading (more respondents agreed to this statement than disagreed, but 50% were neutral). About 65% of respondents reported that they would rather be in a position to capture upward movements in prices than have their prices locked in during the growing season. About 58% of producers said they believed that, on average, alternative pricing mechanisms resulted in a higher price than selling only in the cash market. This response provides evidence that at least 58% of producers would prefer to use alternative marketing strategies rather than selling their crop in the cash market. About 53% of respondents said they think that using futures can reduce their price risk. About 63% of producers reported no difficulty in understanding the market information they receive, but understanding market information did not appear to directly translate into the use of hedging. However, extensive use of indirect forms of hedging, such as marketing pools and forward contracts, could possibly explain this contradiction.

Table 8 presents a percentage distribution of producer responses to selected questions, which tend to suggest reasons for the lack of use of futures markets. About 66% of producers indicated that they preferred to use other means of risk management rather than hedging. This finding suggests that alternative methods of risk management are a strong alternative to hedging, and it is necessary to analyze hedging in conjunction with these alternative methods. However, 52% of producers disagreed with the statement, "Having bought crop insurance makes me less likely to hedge." This suggests that crop insurance is probably not one of the strongest substitutes for hedging. A strong belief of producers (53%) that marketing pools can net them a higher price and high membership levels (58%) in marketing cooperatives is indicative of the popularity of this marketing tool.

**Table 7. Percentage distribution and average ratings of selected statements supporting the use of futures and options markets.**

| Attitude toward futures markets | Strongly agree 5 | Agree 4 | Neutral 3 | Disagree 2 | Strongly disagree 1 | Average score |
|---|---|---|---|---|---|---|
| | % | % | % | % | % | |
| On average, alternative pricing mechanisms will result in a higher price than selling only in the cash market. | 13 | 45 | 34 | 8 | 1 | 3.61 |
| On average, using futures increases my revenues more than the cost of trading. | 2 | 30 | 50 | 17 | 1 | 3.14 |
| Using futures can reduce my price risk. | 6 | 47 | 39 | 7 | 2 | 3.47 |
| I believe that market timing strategies can increase revenues. | 18 | 60 | 20 | 2 | 1 | 3.92 |
| The market information I receive is too difficult for me to understand. | 3 | 16 | 18 | 50 | 13 | 2.47 |
| I would rather be in a position to capture upward movements in prices than have my price locked in during the growing season. | 8 | 57 | 24 | 10 | 1 | 3.59 |

**Table 8. Percentage distribution and average ratings of selected statements disapproving the use of futures and options markets.**

| Attitude toward futures markets | Strongly agree 5 | Agree 4 | Neutral 3 | Disagree 2 | Strongly disagree 1 | Average score |
|---|---|---|---|---|---|---|
| | % | % | % | % | % | |
| A marketing pool nets me a higher price than I can get myself. | 25 | 28 | 31 | 14 | 2 | 3.6 |
| Trading futures/options is too complicated. | 7 | 32 | 25 | 28 | 7 | 3.04 |
| I prefer to use other means of risk management rather than hedging. | 13 | 53 | 21 | 11 | 1 | 3.65 |
| Having bought crop insurance makes me less likely to hedge. | 4 | 16 | 28 | 46 | 6 | 2.65 |
| Margin calls on futures contracts create a cash flow problem for me. | 6 | 39 | 30 | 24 | 1 | 3.25 |
| Commodity brokers are acting in my best interest. | 2 | 11 | 43 | 33 | 11 | 2.59 |

Table 8 reports a number of factors that could have made hedging less attractive for cotton producers. About 45% of producers reported that margin calls created a cash flow problem, and about 39% indicated that trading futures/options was too complicated. About 44% disagreed with the statement, "Commodity brokers are acting in my best interest." These factors might have contributed to the fact that respondents of the survey preferred to use other means of risk management rather than hedging.

Table 9 reports percentage distributions and average ratings of selected statements about producers' marketing practices. Producers generally disagreed with the statements that they are required to use forward contracts (84%) or hedging (86%) by their lenders. About 90% of respondents also indicated that their lenders do not hedge their crop on their behalf. This information suggests that lenders do not offer any incentives for farmers to use any form of hedging or forward pricing, which is contradictory to the risk-balancing hypothesis of hedging discussed in the previous literature (Turvey; Barry and Willman; Harris; and Baker). About 69% of respondents agreed with the statement, "I am more concerned about a large loss in my farm operation than missing a substantial gain." This response may mean that most cotton farmers follow some safety-first criteria in their marketing decisions and/or that they are risk averse for losses and not so risk averse for gains.

About 40% of producers indicated they did not have a set marketing strategy that they followed during the growing season, and about 45% indicated they did not always spread the sale of their cotton over the year. This evidence suggests that producers respond to market information as it becomes available, which corresponds to the dynamic structure of hedging. Alternatively, this could imply that given participation in the pool, producers do not respond to market information at all. It also appears that cotton marketing transactions are "lumpy," which means that producers are probably trying to sell their crop when they are satisfied with a price, rather than spreading out the sale through the year as expected production becomes more certain.

### Other Factors that Affect Hedging

Previous studies (e.g., McKinnon, Grant) pointed out the importance of production uncertainty for hedging decisions. This survey attempted to derive estimates of cotton yield variability. Because yields vary significantly depending on a production region, a regional analysis of expected cotton yields is presented in Table 10. This table reveals that cotton yields in the Southeast and Midsouth are similar to the national average, while yields in the Southwest appear lower than average, and yields in the West are higher than average. These data are consistent with regional production characteristics. Across the country, respondents of the survey reported

**Table 9. Percentage distribution and average ratings of selected statements about marketing practices.**

| Attitude toward futures markets | Strongly agree 5 | Agree 4 | Neutral 3 | Disagree 2 | Strongly disagree 1 | Average score |
|---|---|---|---|---|---|---|
| | % | % | % | % | % | |
| I have a set hedging strategy that I follow during the growing season. | 1 | 19 | 40 | 31 | 9 | 2.73 |
| I am more concerned about a large loss in my farm operation than missing a substantial gain. | 21 | 48 | 19 | 12 | 1 | 3.77 |
| I am required to use forward contracts by my lender. | 0 | 1 | 15 | 56 | 28 | 1.89 |
| I am required to use hedging by my lender. | 0 | 1 | 13 | 58 | 28 | 1.87 |
| My lender hedges my crop for me. | 0 | 1 | 9 | 54 | 36 | 1.75 |
| I always spread the sale of my cotton over the year. | 3 | 33 | 19 | 37 | 8 | 2.87 |

that their average most likely yield was 737.77 pounds per acre, the average lowest yield was 515.18 pounds per acre, and the average highest yield was 955.93 pounds per acre. Estimates of expected yield variability were calculated using the extended Swanson-Megill technique, as described in Keefer and Bodily. The estimated standard deviation on cotton yield was 194.52 pounds per acre, which yields a coefficient of variation (a measure of yield risk) of 26.4%.

Some researchers (Lapan and Moschini; Batlin; Paroush and Wolf; and Antonovitz and Nelson) argued that basis risk has a negative impact on hedging. Basis risk is the difference between local price and the futures price caused mainly by location and quality differences. Table 11 reports cotton producer average cash price expectations for 2000 by region. This table demonstrates that the price expectations in the Southwest were below average, and the price expectations in the West were above average, while price expectations in the Southeast and Midsouth were close to average. This evidence is consistent with the production and quality characteristics of cotton grown in these regions and reflects that "basis" risk is more prevalent in the Southwestern and Western production regions of the United States.

Previous research (e.g., Lapan, Moschini, and Hanson; Brorsen; and Vukina, Li, and Holthausen) also suggested that higher expected cash price discourages hedging, while higher expected cash price variance encourages additional hedging. The respondents of this survey (across the U.S.) indicated that the average most likely harvest time cash price was 56.23 cents per pound, the average lowest harvest time cash price was 48.15 cents per pound, and the average highest harvest time price was 66.77 cents per pound (Table 11). The estimated mean and standard deviation of the expected cotton cash price during harvest was derived using

**Table 10. Cotton producers' average yield expectations for 2000 by region.**

| Variable | Southeast | Midsouth | Southwest | West | U.S. |
|---|---|---|---|---|---|
| | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* |
| Most likely cotton yield | 716.88 | 846.42 | 556.14 | 1334.38 | 737.77 |
| The lowest cotton yield | 469.17 | 686.79 | 312.50 | 1031.25 | 515.18 |
| The highest cotton yield | 977.08 | 1046.43 | 782.61 | 1581.25 | 955.93 |
| Mean | 720.63 | 858.53 | 550.99 | 1317.50 | 736.44 |
| Standard deviation | 196.74 | 139.64 | 182.12 | 213.46 | 170.71 |
| No. of observations | 24 | 28 | 44 | 8 | |

| Table 11. Cotton producers' average cash price expectations for 2000 by region. | | | | | |
|---|---|---|---|---|---|
| **Variable** | **Southeast** | **Midsouth** | **Southwest** | **West** | **U.S.** |
| | *¢/lb* | *¢/lb* | *¢/lb* | *¢/lb* | *¢/lb* |
| Most likely harvest time cash price | 57.79 | 58.04 | 53.17 | 62.50 | 56.23 |
| The lowest cash price during harvest | 49.50 | 51.74 | 42.63 | 57.00 | 48.15 |
| The highest cash price during harvest | 69.91 | 66.37 | 64.88 | 71.88 | 66.77 |
| Mean | 58.94 | 58.65 | 53.52 | 63.66 | 56.97 |
| Standard deviation | 7.96 | 5.69 | 8.62 | 5.84 | 8.45 |
| No. of observations | 24 | 28 | 44 | 8 | |

extended Swanson-Megill technique (Keefer and Bodily). This analysis resulted in a mean expected cotton price of 56.97 cents per pound and a standard deviation of cotton price of 8.45 cents per pound, suggesting a perceived cash price volatility of 15%.

Higher expected futures price is expected to induce more hedging, while higher expected variance of the futures price is hypothesized to discourage hedging. This variable is not expected to have regional variation, because futures contracts are uniform across the country. The respondents of the survey reported that the average most likely harvest time futures price was 58.90 cents per pound, the average lowest harvest time futures price was 51.23 cents per pound, and the average highest harvest time futures price was 67.88 cents per pound (Table 12). Average mean and variance of the expected December futures price during harvest were derived using an extended Swanson-Megill technique (Keefer and Bodily). According to these estimates, the mean expected futures price was 59.29 cents per pound, and the standard deviation of futures price was 8.21 cents per pound. This finding suggests a perceived futures price volatility of 13.85%.

Because basis risk is caused mainly by location and quality differences, quality characteristics of cotton crops were analyzed across regions. The "base" quality characteristics for the futures contract are grade, 41; length, 34; strength, 25; and micronaire, 42. Across the U.S., survey respondents reported the average grade of their crop to be 35; average length, 34; average strength, 28; and average micronaire, 43. Therefore, on average, there were no significant differences between the quality characteristics of cotton produced by the respondents of the survey and the "base" quality of the futures contract. The regional analysis reveals that cotton producers in the West and Midsouth may receive premiums for staple length, while Southwestern cotton may be discounted based on this quality characteristic. Regional differences also suggest that cotton producers in the West may receive premiums for strength, while cotton producers in the Midsouth may receive discounts for micronaire. Producers also reported that the degree of variation in quality across bales was close to average; no significant regional differences in quality variation were detected (1.73 with average = 2).

| Table 12. Cotton producers' futures price expectations for 2000. | | | | | |
|---|---|---|---|---|---|
| **Variable** | **Mean** | **Std. Dev.** | **Minimum** | **Maximum** | **No. obs.** |
| | *¢/lb* | *¢/lb* | *¢/lb* | *¢/lb* | |
| Most likely December futures price during harvest | 58.90 | 5.62 | 45 | 75 | 145 |
| The lowest December futures price during harvest | 51.23 | 7.57 | 0 | 70 | 145 |
| The highest December futures price during harvest | 67.88 | 9.06 | 0 | 95 | 145 |

# CONCLUSIONS

In general, this survey revealed that very few cotton producers use hedging as their primary marketing tool. The majority of producers reported using marketing pools for pricing their cotton. A decreasing trend in the use of cash sales and forward contracts and an increasing trend in the use of marketing pools and direct hedging have been observed. These tendencies in producer marketing behavior may be explained by the economic characteristics of producers and their farm operations, their use of alternative risk-reducing means, and some noneconomic factors. Future research will attempt to examine the relationships between farm and farmer characteristics and their use of alternative marketing strategies. At present, it appears that the more "market-oriented" farm policy embodied within the FAIR Act has led to an increase in forward pricing among producers. The majority of this forward pricing, however, is occurring through marketing pools and forward contracts, suggesting a need for research and education on the use of these instruments.

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