The Private Sector Approach to Grain Marketing: The Case of Agricultural Market Advisory Services

by

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Presented at "Producer Marketing and Risk Management: Frontiers for the 21st Century," a Conference Sponsored by the Food and Agricultural Marketing Policy Section of the American Agricultural Economics Association, January 13-14, 2000, Homewood Suites Hotel, International Drive, Orlando, Florida

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Abstract

The purpose of this paper is to investigate the pricing performance and behavior of market advisory services in corn and soybeans. Data on corn and soybean net price received for advisory services, as reported by the AgMAS Project, are available for the 1995, 1996 and 1997 marketing years. Performance test results suggest that, on average, market advisory services exhibit a small ability to "beat the market". This conclusion is somewhat sensitive to the type of performance test and market benchmark considered. The predictability results provide little evidence that future advisory service pricing performance can be predicted from past performance. Marketing profiles identify three marketing “styles”: i) “scale-up” sales, ii) selective hedging and iii) “speculative” hedging. Advisory services tend to follow the same approach across crop years.

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In the wake of the *FAIR Act* of 1996, there has been a great deal of discussion in agriculture about the need for greater attention to grain marketing and risk management. Comments from a panel of farm managers (Johnston and Schertz, 1998) are representative:

> *Greater adjustment of acreage and increased price volatility leads to a need for more attention to marketing.*
>
> *Farmers must concentrate on marketing for a huge part of their business if they plan to stay in business.*
>
> *Producers and land owners need to be focused on marketing. Marketing is much more critical to success in farming than ever before.*

Implicit in this discussion is the assumption that the private-sector will play a more important role in grain marketing and risk management.

Market advisory services represent an important source of private-sector grain marketing information and advice for farmers in the post-*FAIR* world. Surveys document the popularity of these services among farmers. For example, Patrick, Musser, and Eckman (1998) indicate that 35 and 38 percent of large-scale, midwestern grain farmers used marketing consultants in 1993 and 1994, respectively. Schroeder, Parcell, Kastens and Dhuyvetter (1998) survey Kansas crop farmers and report that market advisory services and newsletters are the highest ranked source of information used to formulate price expectations. It is interesting to note that farmers rank advisory services even higher than futures markets in this survey.

Given the important role that market advisory services play in grain marketing and risk management, it is somewhat surprising that only two previous academic studies investigate the performance of advisory services (Gehrt and Good, 1993; Martines-Filho, 1996). Both studies

generally find that corn and soybean farmers obtain a higher price by following the marketing recommendations of advisory services. While a useful starting point, these two studies have important limitations. First, the sample of advisory services is quite small, with the largest sample including only six advisory services. Second, the results may be biased due to the nature of the sample selection process. The literature on the performance of mutual funds and investment newsletters highlights the sample selection biases that plague many performance results (e.g. Brown, Goetzmann, Ibbotson, and Ross, 1992; Jaffe and Mahoney, 1999; Metrick, 1999). The most relevant bias for previous studies of market advisory services is survivorship bias, which results from tracking only advisory services that remain in business at the *end* of a sample period.

The previous discussion suggests the academic literature provides little basis for evaluating the performance and behavior of market advisory services. In 1994, the Agricultural Market Advisory Service (AgMAS) Project was initiated, with the goal of providing unbiased and rigorous evaluation of market advisory services for farmers. Since its inception, the AgMAS Project has collected marketing recommendations for about 25 market advisory programs. The AgMAS Project subscribes to all of the services that are followed, and as a result, "real-time" recommendations are obtained. This prevents the data from being subject to survivorship bias.

The purpose of this paper is to investigate the pricing performance and behavior of market advisory services in corn and soybeans. Market advisory service recommendations for corn and soybeans are available from the AgMAS Project for the 1995, 1996 and 1997 marketing years. At least 21 advisory services are included for each commodity and marketing year. The first issue investigated is whether market advisory services, on average, outperform an appropriate market benchmark. Tests of performance relative to a benchmark are based on the

proportion of services exceeding the benchmark price and the average percentage difference between the net price of services and the benchmark price. The second issue analyzed is whether market advisory services exhibit predictability in their performance from year-to-year. Tests of predictability are based on the year-to-year correlation of advisory service ranks, prices and percentage differences from the benchmark. The third and final issue investigated is the marketing behavior of advisory services. A daily index of the net amount sold for a representative set of market advisory programs is used to illustrate different categories of market advisory service behavior. When the daily values of the index are plotted for the entire marketing period, the marketing "profile" for a program is generated.

Data on Advisory Service Recommendations

The market advisory services included in this study do not comprise the population of market advisory services available to farmers. The included services also are not a random sample of the population of market advisory services. Neither approach is feasible because no public agency or trade group assembles a list of advisory services that could be considered the "population." Furthermore, there is not a generally agreed upon definition of an agricultural market advisory service. To assemble a sample of services for the AgMAS Project, criteria are developed to define an agricultural market advisory service and a list of services is assembled.

The first criterion used to identify services is that a service has to provide marketing advice to farmers. Some of the services tracked by the AgMAS Project do provide speculative trading advice, but that advice must be clearly differentiated from marketing advice to farmers for the service to be included. The terms "speculative" trading of futures and options versus the use of futures and options for "hedging" purposes are used for identification purposes only. A

discussion of what types of futures and options trading activities constitute hedging, as opposed to speculating, is not considered.

The second criterion is that specific advice must be given for making cash sales of the commodity, in addition to any futures or options hedging activities. In fact, some marketing programs evaluated by the AgMAS Project do not make any futures and options recommendations. However, marketing programs that make futures and options hedging recommendations, but fail to clearly state when cash sales should be made, or the amount to be sold, are not considered.

The original sample of market advisory services that met the two criteria were drawn from the list of "Premium Services" available from the two major agricultural satellite networks, Data Transmission Network (DTN) and FarmDayta in the summer of 1994.[1, 2] While the list of advisory services available from these networks was by no means exhaustive, it did have the considerable merit of meeting a market test. Presumably, the services offered by the networks were those most in demand by farm subscribers to the networks. In addition, the list of available services was cross-checked with other farm publications to confirm that widely-followed advisory firms were included in the sample. It seems reasonable to argue that the resulting sample of services was (and remains) generally representative of the majority of advisory services available to farmers.

The original sample for 1995 includes 25 market advisory programs for both corn and soybeans. For a variety of reasons, deletions and additions to the original sample occur over time. In 1996, the total number of advisory programs is 26 for corn and 24 for soybeans, while in 1997 the total is 23 for corn and 21 for soybeans. The term “advisory program” is used because several advisory services have more than one distinct marketing program. A directory

of the advisory services included in the study can be found at the AgMAS Project website (http://www.aces.uiuc.edu/~agmas/).

As mentioned earlier, sample selection biases may plague advisory service databases. The first form is survival bias, which occurs if only advisory services that remain in business at the *end* of a given period are included in the sample. Survival bias significantly biases measures of performance upwards since "survivors" typically have higher performance than "non-survivors" (Brown, Goetzmann, Ibbotson, and Ross, 1992). This form of bias should not be present in the AgMAS database of advisory services because all services ever tracked are included in the sample. The second and more subtle form of bias is hindsight bias, which occurs if data from prior periods are "back-filled" at the point in time when an advisory service is added to the database. Statistically, this has the same effect as survivorship bias because data from surviving advisory services is back-filled. This form of bias should not be present in the AgMAS database because recommendations are not back-filled when an advisory service is added. Instead, recommendations are collected only for the marketing year *after* a decision has been made to add an advisory service to the database.

The actual daily process of collecting recommendations for the sample of advisory services begins with the purchase of subscriptions to each of the services. Staff members of the AgMAS Project read the information provided by each advisory service on a daily basis. The information is received electronically, via DTN, web sites or email. For the services that provide two daily updates, typically in the morning and at noon, information is read in the morning and afternoon. In this way, the actions of a farmer-subscriber are simulated in “real-time.”

The recommendations of each advisory service are recorded separately. Some advisory services offer two or more distinct marketing programs. This typically takes the form of one set

of advice for marketers who are willing to use futures and options (although futures and options are not always used), and a separate set of advice for farmers who only wish to make cash sales.[3] In this situation, both strategies are recorded and treated as distinct strategies to be evaluated.[4]

Several procedures are used to check the recorded recommendations for accuracy and completeness. Whenever possible, recorded recommendations are cross-checked against later status reports provided by the relevant advisory service. Also, at the completion of the marketing year, it is confirmed whether cash sales total exactly 100 percent, all futures positions are offset, and all options positions are offset or expire worthless.

Calculation of Net Advisory Service Prices

At the end of each marketing year, all of the (filled) recommendations are aligned in chronological order. The advice for a given marketing year is considered to be complete for each advisory program when cumulative cash sales of the commodity reach 100 percent, all open futures positions covering the crop are offset, all open option positions covering the crop are either offset or expired, and the advisory program discontinues giving advice for that crop year. The returns to each recommendation are then calculated in order to arrive at a weighted-average net price that would be received by a producer who precisely follows the marketing advice (as recorded by the AgMAS Project).

In order to simulate a consistent and comparable set of results across the different advisory services, certain explicit assumptions are made. These assumptions are intended to accurately depict marketing conditions for a representative, central-Illinois farm. An overview of the simulation assumptions is presented below. Complete details of the simulation assumptions can be found in Jackson, Irwin and Good (1999).

A two-year marketing window, spanning September of the year before harvest through August of the year after harvest, is used in the analysis. For example, the 1997 marketing window is September 1, 1996 through August 31, 1998. The beginning date is selected because advisory services in the sample generally begin to make marketing recommendations around this date. The ending date is selected to be consistent with the ending date for corn and soybean marketing years as defined by the US Department of Agriculture (USDA). There are a few exceptions to the marketing window definition. Several advisory programs have relatively small amounts (10 percent or less) of cash corn or soybeans unsold as of the end of a window. One marketing program also began pre-harvest hedges prior to September 1, 1996. In these cases, the actual sales recommendations on the indicated dates are recorded.

The cash price assigned to each cash sale recommendation is the central-Illinois closing, or overnight, bid. The central-Illinois price is the mid-point of the range of bids by elevators in a 25-county area in central and east central-Illinois. The bids are collected and reported by the Illinois Department of Ag Market News. The central-Illinois market also is used for cash-forward contract transactions. Futures prices and options premia are Chicago Board of Trade quotes.

Since most of the advisory program recommendations are given in terms of the proportion of total production (e.g., "sell 5 percent of 1997 crop today"), some assumption must be made about the amount of production to be marketed. For the purposes of this study, if the per-acre yield is assumed to be 100 bushels, then a recommendation to sell 5 percent of the corn crop translates into selling 5 bushels. When all of the advice for the marketing year has been carried out, the final per-bushel selling price is the average price for each transaction weighted by the amount marketed in each transaction.

When making hedging or forward contracting decisions prior to harvest, the actual yield is unknown. Hence, an assumption regarding the amount of expected production per acre is necessary to accurately reflect the returns to marketing advice. Prior to harvest, the best estimate of the current year's expected yield is a function of yield in previous years. In this study, the assumed yield prior to harvest is based on a linear regression trend yield, while the actual reported yield is used from the harvest period forward.

Brokerage costs are incurred when farmers open or lift positions in futures and options markets. For the purposes of this study, it is assumed that brokerage costs are $50 per contract for a round-turn for futures transactions, and $30 per contract to enter or exit an options position. Further, it is assumed that CBOT corn and soybean futures are used, and the contract size for each commodity is 5,000 bushels. Therefore, per-bushel brokerage costs are 1 cent per bushel for a round-turn futures transaction and 0.6 cents per bushel for each options transaction.

An important element in assessing returns to an advisory program is the economic cost associated with storing grain instead of selling grain immediately at harvest. The cost of storing grain after harvest (carrying costs) consists of two components: physical storage charges and the opportunity cost incurred by foregoing sales when the crop is harvested. Physical storage charges can apply to off-farm (commercial) storage, on-farm storage, or some combination of the two. Opportunity cost is the same regardless of the type of physical storage.

For the purposes of this study, it is assumed that all storage occurs off-farm at commercial sites. Carrying costs are assigned beginning at the end of harvest. Physical storage charges are assumed to be a flat 13 cents per bushel from the end of harvest through December 31. After January 1, physical storage charges are assumed to be 2 cents per month (per bushel),

with this charge pro-rated to the day when the cash sale is made. The storage costs represent the typical storage charges quoted in a non-random telephone survey of central-Illinois elevators.

The interest charge for storing grain is the interest rate compounded daily from the harvest mid-point to the date of sale. The interest rate used is the average rate for all commercial agricultural loans for the fourth quarter of the harvest year and the first three quarters of the next calendar year as reported in the *Agricultural Finance Databook* published by the Board of Governors of the Federal Reserve Board. This interest rate has been around 9 percent per year for the three years of this study.

In addition to the storage and interest costs, another charge is assigned to corn (but not soybeans). This charge, referred to as a "shrink charge", is commonly deducted by commercial elevators on "dry" corn that is delivered to the elevator to be stored, and reflects a charge for drying and volume reduction (shrinkage) which occurs in drying the corn from (typically) 15 percent to 14 percent moisture. The charge for drying is a flat 2 cents per bushel, while the charge for volume reduction is 1.3 percent per bushel. The charge for this volume reduction is calculated as 1.3 percent times the average harvest-time cash price for each marketing year. For example, for the 1997 crop the harvest-time cash price was $2.65 per bushel, so the charge for volume reduction was 3.4 cents per bushel ($2.65*1.3%).

Market Benchmark

Simply comparing the net price received across advisory services will not answer the question of whether advisory services as a group enhance the income of farm subscribers. Instead, a comparison to a benchmark price (or prices) is needed to evaluate the performance of advisory services relative to pricing opportunities offered by the market. In the stock market,

mutual funds are evaluated with respect to market benchmark performance criteria (e.g., Bodie, Kane, and Marcus, 1989). These benchmarks typically are indexes of stock market returns over the period of evaluation, e.g., the Dow Jones Industrial Average and Standard and Poor's 500.

The selection of a benchmark for advisory service performance evaluations is examined in a recent report by Good, Irwin and Jackson (1998). They argue that the most appropriate market benchmark is the average cash price for corn and soybeans over the entire marketing horizon. The marketing window used in the AgMAS project for a given crop spans two calendar years, beginning on the first business day of September in the year prior to harvest, and extends through the last business day of August in the year after harvest. Hence, the market benchmark is calculated as the average of the daily central-Illinois cash grain bids available for the two-year marketing window. Pre-harvest cash prices represent cash-forward bids for harvest delivery in central-Illinois, while daily spot prices for central-Illinois are used for the post-harvest period.

Two adjustments are made to the daily cash prices to make the average cash price benchmark consistent with the calculated net advisory prices for each marketing program. First, instead of taking the simple average of the daily prices, a weighted average price is calculated to account for changing yield expectations. The daily weighting factors for pre-harvest prices are based on the calculated trend yield, while the weighting of the post-harvest prices is based on the actual reported yield for central-Illinois. The second adjustment to the daily cash prices is to adjust the post-harvest cash prices to a harvest equivalent by subtracting carrying charges. The daily carrying charges are calculated in the same manner as those for the net advisory price. Complete details of the construction of this benchmark price can be found in Good, Irwin and Jackson (1998).

In order to test the sensitivity of performance results to the choice of market benchmark, two alternative versions of the previous average cash price benchmark also are considered in the analysis. The first alternative benchmark averages prices for the 20-month period starting in January of the year of harvest and ending in August of the year after harvest. The only difference between this alternative and the 24-month benchmark is the exclusion of the pre-harvest period previous to January. Hence, this alternative benchmark places more weight on post-harvest prices than pre-harvest prices. The second alternative benchmark averages prices only for a 12-month marketing year, and includes only post-harvest prices in the averaging process.

Statistical Tests of Market Advisory Service Pricing Performance

Two statistical tests are used to test the null hypothesis that average market advisory service pricing performance does not differ from that of the market benchmark. The first test is based on the proportion of services exceeding the benchmark price.[5] This test is considered because it is not influenced by extremely high or low advisory prices. The second test is based on the average percentage difference ("return") between the net price of services and the benchmark price.[6] This test is useful because it takes into account the average magnitude of differences from the benchmark.[7] Further details on the two statistical tests can be found in Irwin, Jackson and Good (1999).

Table 1 reports results of the proportional test of corn pricing performance for each year and all three years pooled. Statistical significance is based on a null hypothesis proportion of 0.5, the same as the proportion of heads observed in the flips of a fair coin. Individual year results are quite sensitive to the benchmark considered. For example, the proportion of services above the 24-month benchmark price in 1995 is 0.72 and statistically significant, while the

proportion of services above the 12-month benchmark is only 0.08. This latter proportion is also statistically significant, but in the opposite direction, indicating significantly inferior performance. Despite the variation across benchmarks for individual years, the overall proportions for the three years are similar across the benchmarks, ranging only from 0.51 to 0.59. None of the three-year proportions are significantly different from 0.5 at the five- or ten-percent level, although the 12-month benchmark proportion is quite close to significance at the ten-percent level.

Table 2 shows the results of the proportional test of soybean pricing performance for each year and all three years pooled. Like corn, individual year results are sensitive to the benchmark considered. The most dramatic contrast again can be found in 1995, where the proportion of services above the 24-month benchmark price is 0.84 and statistically significant, while the proportion of services above the 12-month benchmark is only 0.16. The overall proportions for the three years range from 0.57 to 0.77. Two of the three-year proportions (24-month and 20-month benchmarks) are significantly greater than 0.5 at the one-percent level.

Table 3 reports proportional test results for combined corn and soybean revenue. The per-acre revenue for each commodity is found by multiplying the net advisory price for each market advisory program by the actual central-Illinois corn or soybean yield for each year. A simple average of the two per acre revenues is then taken to reflect a farm that uses a 50/50 rotation of corn and soybeans. As would be expected, the proportions for revenue per acre fall between the proportions for corn and soybean net advisory prices and show a similar pattern of variation across the alternative benchmarks in a given year. Combined corn and soybean performance for the entire three-year period is less variable across the benchmarks, with the

proportion of programs above the benchmark ranging only from 0.60 to 0.64. It is noteworthy that the three-year proportions are significantly above 0.5 for all three benchmarks.

Results for the average return test of pricing performance are reported in Tables 4, 5 and 6. Individual year and three-year average test results for corn, shown in Table 4, are qualitatively the same as the proportional test results. Point estimates of the three-year average returns range from –0.34 to 0.74 percent. However, none of the three-year average corn returns are significantly different from zero. Individual year and three-year average results for soybeans, reported in Table 5, are qualitatively similar to the proportional test results. The only differences occur in 1997 for the 24-month and 20-month benchmarks, where significance is detected for average soybean returns but not the proportion of services above the market. Point estimates of the three-year average soybean returns range from 0.71 to 3.00 percent, substantially higher than for corn. Two of the three-year average soybean returns are significantly different from zero (24-month and 20-month benchmarks). Results of the average return test for combined corn and soybean revenue, found in Table 6, differ the most from proportional test results. Three-year average revenue returns are significant only for the 24-month benchmark, whereas three-year proportions are significant for all three benchmarks. This divergence in results appears to be due to large, negative returns in some years (e.g. 1995, 12-month average benchmark) and relatively higher variation in returns as compared to proportions. Point estimates of the three-year average revenue returns range from -0.30 to 1.84 percent, which, as expected, is between the ranges for corn and soybeans.

In statistical terms, the pricing performance test results presented in this section are fairly clear. Little or no evidence is found regarding the ability of market advisory services to consistently and significantly “beat the market” for corn. There is substantial evidence that

market advisory services consistently and significantly “beat the market” in soybeans. When corn and soybean net advisory prices are combined into revenue per acre, some evidence also is found that market advisory services significantly outperform the market. Tests results for revenue are the most sensitive to the type of test and benchmark considered. Overall, the statistical results suggest that market advisory services have some ability to outperform broad market benchmarks.

Given the statistical results summarized above, a relevant question to ask is whether the pricing performance of advisory services also is economically significant. While "economic significance" is a vague concept, it is important nonetheless. Perhaps the best perspective on this question is gained by re-examining returns for corn and soybean revenue per acre. Given the sensitivity of measured returns to the benchmark considered, the best point estimate of revenue returns probably is the simple average across the three benchmarks. This “grand average” revenue return across all three marketing years is 0.74 percent, which translates into about $3 per acre above benchmark revenue.[8] While this level of return is probably best characterized as “small,” it also appears to be non-trivial, particularly in comparison to the cost of the services. Jackson, Irwin and Good (1999) report that the average cost of the services is $279 per year. For a 1,000 acre corn and soybean farm, this translates into an average cost of only 28 cents per acre. There are two important reasons to be cautious about concluding that advisory returns generate even a "small" level of economic significance: i) the results are based on a limited sample of years, and ii) returns are concentrated in only one market, soybeans.

Predictability of Advisory Service Performance

Even if, as a group, advisory services generate positive returns, there is a wide range in performance for any given year. For example, soybean net advisory prices for 1995 vary from $5.71 per bushel to $7.94 per bushel. While this example is the most dramatic, the variation across advisors in other cases also is substantial. This raises the important question of the predictability of advisory service performance from year-to-year. In other words, is past performance indicative of future results? This issue is addressed by calculating correlation coefficients for measures of advisory service performance across adjacent marketing years. The testing procedures have been widely applied in studies of financial investment performance (Elton, Gruber, and Rentzler, 1987; Irwin, Zulauf and Ward, 1994; Lakonishok, Shleifer and Vishny, 1992). Recent analysis by Brorsen and Townsend (1998) indicates these methods are reasonably powerful in detecting performance persistence if it exists.

The first step in predictability analysis is to rank each advisory service based on net price received. Then the services are sorted in descending order. For example, the service with the highest net advisory price is ranked number one, and the service with the lowest net advisory price is assigned a number equal to the total number of observations for that commodity in the given year. Finally, the correlation coefficient is computed between the sorted performance measures for two adjacent marketing years. A significant correlation indicates predictability in returns across years.

Estimated correlation coefficients and tests of significance are presented in Table 7.[9, 10] For corn, a significant and moderately positive correlation is found in the net advisory price and the percentage return above the 24-month benchmark between the 1995 and 1996 marketing years. A positive correlation also is found between the rank of the services in corn between 1995

and 1996, but it is not statistically significant. Nominally, just the opposite situation occurs for the 1996 and 1997 marketing years, where negative correlations are found for all three performance measures. The net result is a small average correlation coefficient across the two pairs of years, about 0.10. Hence, there does not appear to be consistent pricing performance across time in corn for individual advisory services.

Little evidence of predictability is found for soybeans. All of the estimated correlation coefficients are positive, but only one is significantly different from zero (rank correlation, 1995 vs. 1996). When averaged across the two pairs of marketing years, the correlation is only about 0.20. Predictability results for revenue are similar to those found for corn and soybeans. Overall, there does not appear to be evidence of persistence in the pricing performance of market advisory services.

Marketing Behavior of Advisory Services

Pricing performance, as investigated in the previous two sections, is critical to understanding the grain marketing performance farmers may expect from advisory services. However, pricing performance is not likely to be the only relevant criterion. For example, two advisory services may generate similar net price results in a given marketing year, but the paths to that result might differ significantly along several dimensions, including: i) type of recommended pricing tool (cash, futures, options, etc.), ii) timing of sales, and iii) frequency of transactions.

Specific examples help illustrate the range of approaches that advisory services may employ. One service may make use of "selective" hedging strategies, while another may use only "conventional" hedging strategies and cash sales. Some services may recommend selling

(writing) options, while others only recommend buying options. Storage may or may not be recommended. Additionally, a particular service may use a strategy involving only a few pricing decisions, but in large quantities, while a competitor uses numerous pricing decisions in smaller quantities.

It is well known that farmers differ in their approach to marketing (e.g., Goodwin and Schroeder, 1994; Goodwin and Kastens, 1996; Patrick, Musser, and Eckman, 1998). As a result, differences in the marketing approach of advisory services should influence a farmer's choice of services. However, there is no previous research on the marketing behavior of different advisory services.

A daily index of the net amount sold for a representative set of market advisory programs is used to illustrate different categories of market advisory service behavior. To construct such an index, the various futures, options, and cash positions recommended for a program on a given day must be weighted in some manner. Fortunately, the price exposure of a portfolio of positions is a weighted-average of the price exposures of the individual positions, where the weights are the "deltas" of the individual positions (Hull, 1997). The definition of delta is the dollar amount that the value of a position changes for a one dollar increase in the price of the underlying commodity.[11] Hence, a long futures position has a delta of +1, as a one dollar per bushel increase in the price of the futures results in one dollar per bushel increase in the value of the position. Complete details of the procedure used to construct the delta-weighted index values can be found in Bertoli, Zulauf, Irwin, Jackson and Good (1999).

When daily values of the index are plotted for the entire marketing window, the marketing "profile" for a program is generated. Marketing profiles are computed for all of the advisory programs included in the pricing performance analysis. Since there are 174 profiles in

total (one for each program per commodity per year) it is not reasonable to present all profiles! Instead, marketing profiles for 1995-1998 are presented for three programs in corn that broadly represent the range of marketing behavior of advisory services. These marketing profiles are presented in Figures 1, 2 and 3. The scale for the net amount sold varies from -80 percent to +120 percent. A negative percent sold represents a net long "hedging" position, +100 percent net sold means that the entire crop has been sold in some form, and above +100 percent represents "over-hedging."

Corn marketing profiles for the Pro Farmer Cash Program (Figure 1) are representative of a traditional "scale-up" approach to marketing, where relatively small increments of the crop are sold at fairly regular time intervals. There is a strong consistency in the market approach across the three years in this case. Corn marketing profiles for the Brock Hedge Program (Figure 2) are representative of a "selective hedging" approach to marketing. Here, short futures or options hedges are placed when prices are expected to decrease and lifted when prices are expected to increase. This may be done quite frequently, as is evident in the marketing profiles for each year. Corn marketing profiles for the Ag Resource Program (Figure 3) are representative of a "speculative" approach to marketing, where net long positions are taken and large swings in the net amount sold may be observed. The marketing behavior observed in 1995 is the most dramatic: a net long position was held for almost a year-and-a-half and then the entire crop was sold over about a two-week period.

Further details regarding the marketing profiles for the three advisory programs are presented in Table 8. The dates of the first and last marketing transaction show that there is considerable variation in the "location" of marketing windows across years for a given program or across programs for a given year. For example, Pro Farmer Cash began marketing the 1997

corn crop in March 1997, while Ag Resource began almost a year earlier, in May 1996. It is not surprising then that the length of the marketing window varied substantially as well. Marketing windows for all three programs averaged more than a year in length (more than 365 calendar days). The shortest window was only 304 days and the longest was 828 days.

Another indicator of marketing behavior is the number of transactions (cash, forward, futures and options). Two observations can be made based on this indicator. First, there are clear differences in trading behavior across the programs. Pro Farmer Cash makes relatively infrequent transactions, while Brock Hedge makes many transactions. Second, the number of transactions per crop year for each advisory program is relatively consistent. The number of transactions per year for Pro Farmer Cash varies only from five to eight. The number of transactions per year for Brock Hedge ranges from 31 to 38. There is somewhat more variation in the number of transactions per year for Ag Resource, with a low of 13 and a high of 23.

The final two indicators presented in Table 8 are the amount of the crop sold on May 1st (planting) and October 1st (harvest). In the case of Pro Farmer Cash, generally no more than one-third of a crop is sold before planting or harvesting. Just the opposite pattern is observed for Brock Hedge, where about three-quarters of the crop typically is sold by planting time. There is no consistent pattern in the case of Ag Resource. Relatively large net long or net short positions can be observed at both planting and harvest time.

The picture that emerges from this discussion of marketing profiles is one of clearly identifiable marketing "styles." The examples suggest that advisory services develop an approach to marketing and consistently follow that approach across crop years. In addition, the approach to marketing, or "style," may differ markedly across services. This provides farmers with a wide-variety of marketing approaches to choose from.

Summary

Market advisory services represent an important source of private-sector grain marketing information and advice for farmers. Given the important role that market advisory services play in grain marketing and risk management, it is somewhat surprising that only two previous academic studies investigate the performance of advisory services (Gehrt and Good, 1993; Martines-Filho, 1996). The lack of studies is most likely due to the difficulty in obtaining data on the stream of recommendations provided by services.

In 1994, the Agricultural Market Advisory Service (AgMAS) Project was initiated, with the goal of providing unbiased and rigorous evaluation of market advisory services for farmers. Since its inception, the AgMAS Project has collected marketing recommendations for about 25 market advisory programs. The AgMAS Project subscribes to all of the services that are followed, and as a result, "real-time" recommendations are obtained. This prevents the data from being subject to survivorship and hindsight biases.

The purpose of this paper is to investigate the pricing performance and behavior of market advisory services in corn and soybeans. Market advisory service recommendations for corn and soybeans are available from the AgMAS Project for the 1995, 1996 and 1997 marketing years. At least 21 advisory services are included for each commodity and marketing year. While the sample of advisory services is non-random, it is constructed to be generally representative of the majority of advisory services available to farmers.

Tests of pricing performance relative to a market benchmark are based on the proportion of services exceeding the benchmark price and the average percentage difference between the net price of services and the benchmark price. In statistical terms, the pricing performance test results provide little evidence that market advisory services consistently and significantly “beat

the market" in corn. There is substantial evidence that market advisory services consistently and significantly "beat the market" in soybeans. When corn and soybean net advisory prices are combined into revenue per acre, some evidence also is found that market advisory services significantly outperform the market. Tests results for revenue are the most sensitive to the type of test and benchmark considered. Overall, the statistical results suggest that market advisory services have some ability to outperform broad market benchmarks.

It is debatable whether the performance of advisory services also is economically significant. Perhaps the best perspective on this question is gained by examining returns for corn and soybean revenue per acre. For all three marketing years, returns averaged 0.74 percent above benchmark revenue, which translates into about $3 per acre. While this level of return is probably best characterized as "small," it also appears to be non-trivial, particularly in comparison to the cost of the services. However, there are two important reasons to be cautious about concluding that advisory returns generate even a "small" level of economic significance: i) the results are based on a small sample of years, and ii) returns are concentrated in only one market, soybeans.

Tests of predictability are based on the year-to-year correlation of advisory service ranks, prices and percentage differences from the benchmark. In general, the predictability results provide little evidence that advisory service pricing performance can be predicted from year-to-year. The average correlation coefficient relating performance from one year to the next is only about 0.10 to 0.20.

A daily index of the net amount sold for market advisory programs is used to illustrate different categories of market advisory service behavior. To construct such an index, the various futures, options, and cash positions recommended for a program on a given day are weighted by

position “deltas.” When daily values of the index are plotted for the entire marketing window, the marketing "profile" for a program is generated. The picture that emerges from the marketing profiles is that of three clearly identifiable marketing “styles”: i) “scale-up” sales, ii) selective hedging and iii) “speculative” hedging. Advisory services tend to follow the same approach across crop years.

In sum, the results of this study suggest that market advisory services exhibit some ability to "beat the market" for corn and soybean crops. In addition, market advisory services provide farmers with a wide-variety of choices regarding marketing approaches. Some are consistent with traditional academic concepts of risk management, while others are highly speculative. If the private-sector is to play a more important role in grain marketing and risk management in the future, more research and education is needed to help farmers match their marketing preferences to the marketing approaches used by private firms.

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Table 1. Number of Advisory Service Programs above Alternative Market Benchmark Prices, Corn, 1995 -1997

Market Benchmark/ Sample Period	Number of Advisory Programs	Number of Programs above Benchmark	Proportion of Programs above Benchmark	Z-statistic	Two-tail p-value
24-Month Average					
1995	25	18	0.72	2.20	0.028**
1996	26	10	0.38	-1.18	0.239
1997	23	10	0.43	-0.63	0.532
1995-1997	74	38	0.51	0.23	0.816
20-Month Average					
1995	25	13	0.52	0.20	0.841
1996	26	10	0.38	-1.18	0.239
1997	23	15	0.65	1.46	0.144
1995-1997	74	38	0.51	0.23	0.816
12-Month Average					
1995	25	2	0.08	-4.20	0.000***
1996	26	23	0.88	3.92	0.000***
1997	23	19	0.83	3.13	0.002***
1995-1997	74	44	0.59	1.63	0.104

Note: Three stars indicates significance at the 1% level, two stars indicates significance at the 5% level, and one star indicates significance at the 10% level.

Table 2. Number of Advisory Service Programs above Alternative Market Benchmark Prices, Soybeans, 1995 -1997

Market Benchmark/ Sample Period	Number of Advisory Programs	Number of Programs above Benchmark	Proportion of Programs above Benchmark	Z-statistic	Two-tail p-value
24-Month Average					
1995	25	21	0.84	3.40	0.001***
1996	24	20	0.83	3.27	0.001***
1997	21	13	0.62	1.09	0.275
1995-1997	70	54	0.77	4.54	0.000***
20-Month Average					
1995	25	18	0.72	2.20	0.028**
1996	24	14	0.58	0.82	0.414
1997	21	14	0.67	1.53	0.127
1995-1997	70	46	0.66	2.63	0.009***
12-Month Average					
1995	25	4	0.16	-3.40	0.001***
1996	24	15	0.63	1.22	0.221
1997	21	21	1.00	4.58	0.000***
1995-1997	70	40	0.57	1.20	0.232

Note: Three stars indicates significance at the 1% level, two stars indicates significance at the 5% level, and one star indicates significance at the 10% level.

Table 3. Number of Advisory Service Programs above Alternative Market Benchmark Revenues, 1995 -1997

Market Benchmark/ Sample Period	Number of Advisory Programs	Number of Programs above Benchmark	Proportion of Programs above Benchmark	Z-statistic	Two-tail p-value
24-Month Average					
1995	25	19	0.76	2.60	0.009***
1996	24	15	0.63	1.22	0.221
1997	21	11	0.52	0.22	0.827
1995-1997	70	45	0.64	2.39	0.017**
20-Month Average					
1995	25	15	0.60	1.00	0.317
1996	24	13	0.54	0.41	0.683
1997	21	15	0.71	1.96	0.050**
1995-1997	70	43	0.61	1.91	0.056*
12-Month Average					
1995	25	2	0.08	-4.20	0.000***
1996	24	20	0.83	3.27	0.001***
1997	21	20	0.95	4.15	0.000***
1995-1997	70	42	0.60	1.67	0.094*

Note: Three stars indicates significance at the 1% level, two stars indicates significance at the 5% level, and one star indicates significance at the 10% level.

Table 4. Average Returns above Alternative Market Benchmark Prices for Advisory Service Programs, Corn, 1995 - 1997

Market Benchmark/ Sample Period	Number of Advisory Programs	Average Return above Benchmark Price (%)	Standard Deviation (%)	t-statistic	Two-tail p-value
24-Month Average					
1995	25	3.97	11.10	1.79	0.086*
1996	26	-1.23	8.49	-0.74	0.466
1997	23	-0.54	7.83	-0.33	0.745
1995-1997	74	0.74	9.44	0.68	0.501
20-Month Average					
1995	25	-1.73	11.10	-0.78	0.445
1996	26	-1.61	8.49	-0.97	0.343
1997	23	2.07	7.83	1.27	0.218
1995-1997	74	-0.51	9.31	-0.47	0.642
12-Month Average					
1995	25	-17.37	11.10	-7.83	0.000***
1996	26	8.26	8.49	4.96	0.000***
1997	23	8.44	7.83	5.17	0.000***
1995-1997	74	-0.34	15.29	-0.19	0.850

Note: Three stars indicates significance at the 1% level, two stars indicates significance at the 5% level, and one star indicates significance at the 10% level.

Table 5. Average Returns above Alternative Market Benchmark Prices for Advisory Service Programs, Soybeans, 1995 - 1997

Market Benchmark/ Sample Period	Number of Advisory Programs	Average Return above Benchmark Price (%)	Standard Deviation (%)	t-statistic	Two-tail p-value
24-Month Average					
1995	25	5.03	6.12	4.11	0.000***
1996	24	2.15	3.14	3.35	0.003***
1997	21	1.54	4.01	1.76	0.094*
1995-1997	70	3.00	4.84	5.18	0.000***
20-Month Average					
1995	25	2.97	6.12	2.43	0.023**
1996	24	0.75	3.14	1.17	0.253
1997	21	2.82	4.01	3.22	0.004***
1995-1997	70	2.17	4.70	3.86	0.000***
12-Month Average					
1995	25	-4.13	6.12	-3.37	0.003***
1996	24	1.03	3.14	1.61	0.122
1997	21	6.09	4.01	6.95	0.000***
1995-1997	70	0.71	6.19	0.955	0.343

Note: Three stars indicates significance at the 1% level, two stars indicates significance at the 5% level, and one star indicates significance at the 10% level.

Table 6. Average Returns above Alternative Market Benchmark Revenues for Advisory Service Programs, Corn and Soybeans, 1995 - 1997

Market Benchmark/ Sample Period	Number of Advisory Programs	Average Return above Benchmark Revenue (%)	Standard Deviation (%)	t-statistic	Two-tail p-value
24-Month Average					
1995	25	4.51	8.33	2.71	0.012**
1996	24	0.26	5.21	0.24	0.810
1997	21	0.47	5.49	0.40	0.696
1995-1997	70	1.84	6.78	2.27	0.026**
20-Month Average					
1995	25	0.37	8.33	0.22	0.826
1996	24	-0.57	5.21	-0.53	0.598
1997	21	2.45	5.49	2.05	0.054*
1995-1997	70	0.67	6.59	0.85	0.396
12-Month Average					
1995	25	-11.75	8.33	-7.05	0.000***
1996	24	4.94	5.21	4.64	0.000***
1997	21	7.33	5.49	6.12	0.000***
1995-1997	70	-0.30	10.80	-0.24	0.815

Note: Three stars indicates significance at the 1% level, two stars indicates significance at the 5% level, and one star indicates significance at the 10% level.

Table 7. Correlation of Advisory Service Performance Between Pairs of Marketing Years, 1995-1997

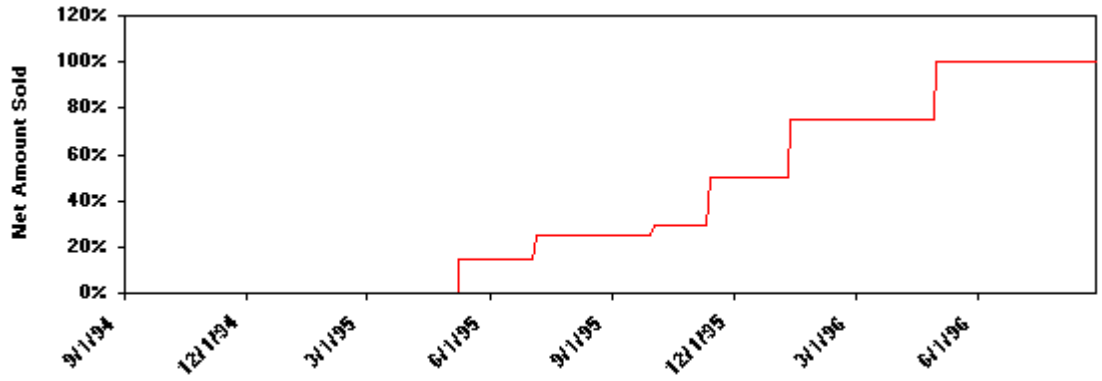
Commodity/ Correlation Measure	1995 vs. 1996	1996 vs. 1997	Average
Corn			
Rank Correlation	0.29	-0.06	0.12
	[0.190]	[0.795]	
Net Price Correlation	0.52**	-0.28	0.12
	[0.013]	[0.206]	
Return Correlation	0.52**	-0.27	0.12
	[0.014]	[0.219]	
Soybeans			
Rank Correlation	0.36*	0.01	0.19
	[0.097]	[0.953]	
Net Price Correlation	0.25	0.17	0.21
	[0.269]	[0.498]	
Return Correlation	0.26	0.17	0.22
	[0.237]	[0.487]	
Revenue			
Rank Correlation	0.35**	-0.05	0.15
	[0.024]	[0.240]	
Revenue Correlation	0.48	-0.27	0.11
	[0.111]	[0.845]	
Return Correlation	0.48**	-0.26	0.11
	[0.023]	[0.263]	

Note: Three stars indicates significance at the 1% level, two stars indicates significance at the 5% level, and one star indicates significance at the 10% level. Return correlations are based on the 24-month average cash price benchmark. Figures in brackets are two-tailed p-values.

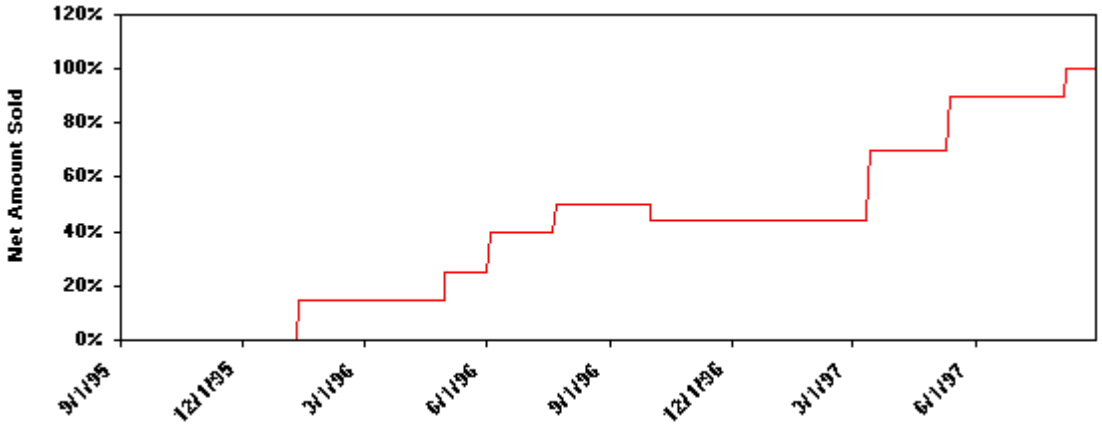
Table 8. Selected Indicators of Advisory Program Marketing Behavior, Corn, 1995-1997

Advisory Program/ Crop Year	Date of First Transaction	Date of Final Transaction	Length of Active Marketing Period (days)	Number of Transactions	Amount Sold May 1 of Crop Year (%)	Amount Sold October 1 of Crop Year (%)
Pro Farmer Cash						
1995	5/9/95	4/30/96	351	5	0	29
1996	1/11/96	8/7/97	566	8	25	45
1997	4/4/97	8/3/98	479	7	10	25
Average			465	7	12	33
Brock Hedge						
1995	1/13/95	11/17/95	304	31	71	58
1996	7/31/95	12/10/96	490	31	80	71
1997	2/27/97	3/12/98	375	38	86	94
Average			390	33	79	75
Ag Resource						
1995	1/23/95	3/28/96	425	13	-35	-22
1996	3/29/96	6/23/97	444	19	35	84
1997	5/13/96	8/31/98	828	23	80	-42
Average			566	18	27	7

Panel A. 1995 Marketing Period



Panel B. 1996 Marketing Period



Panel C. 1997 Marketing Period

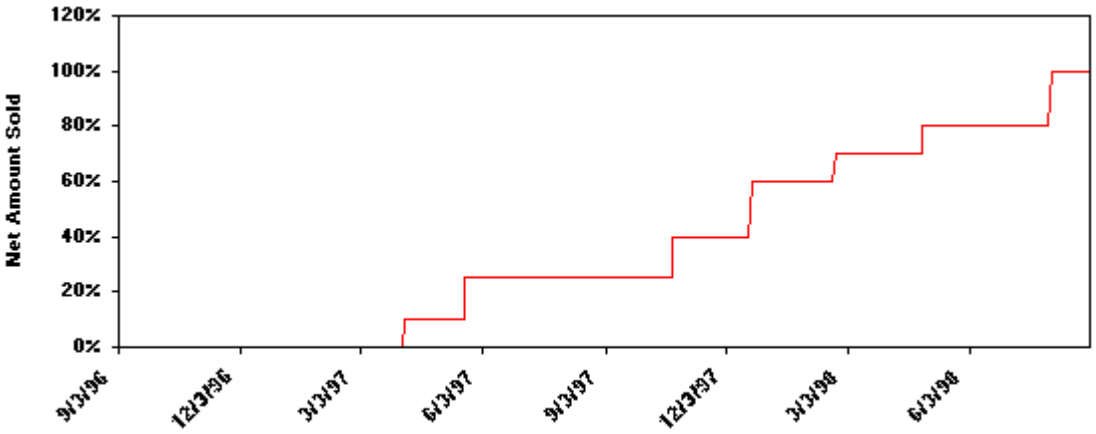
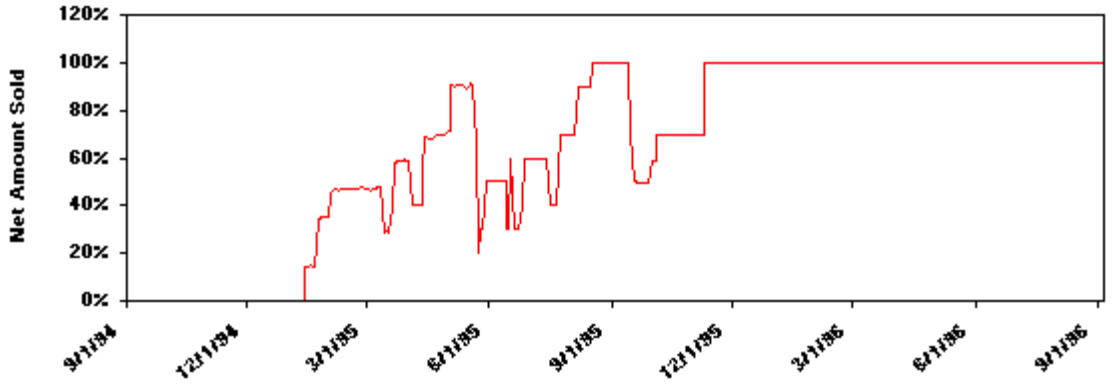
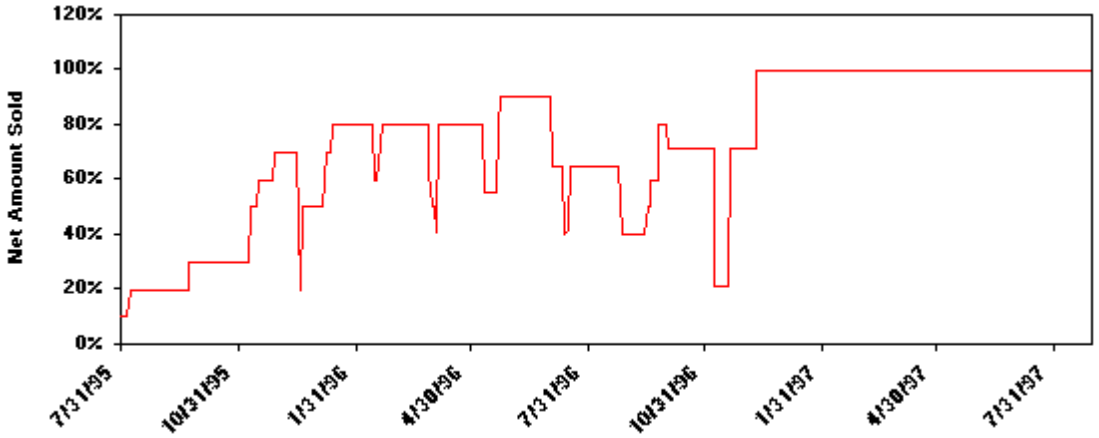


Figure 1. Corn Marketing Profiles for the Pro Farmer Cash Program.

Panel A. 1995 Marketing Period



Panel B. 1996 Marketing Period



Panel C. 1997 Marketing Period

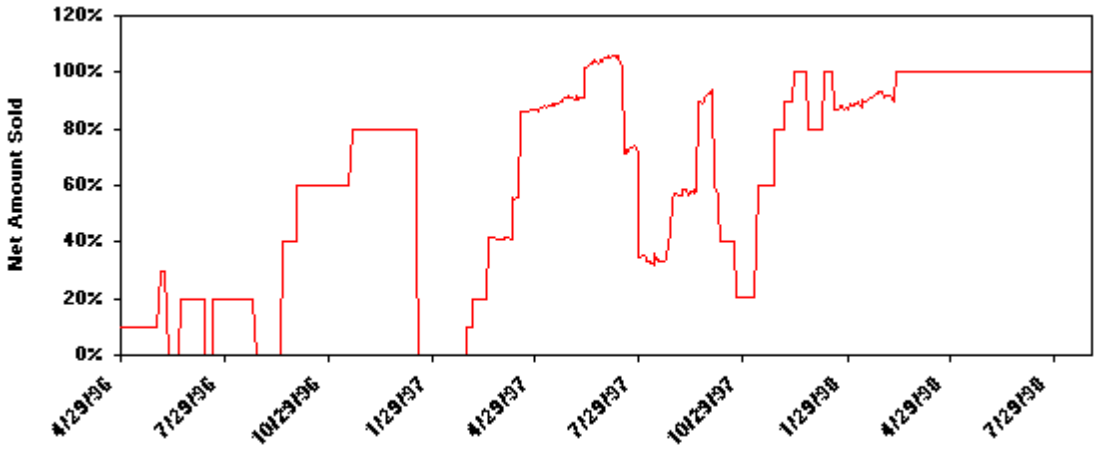
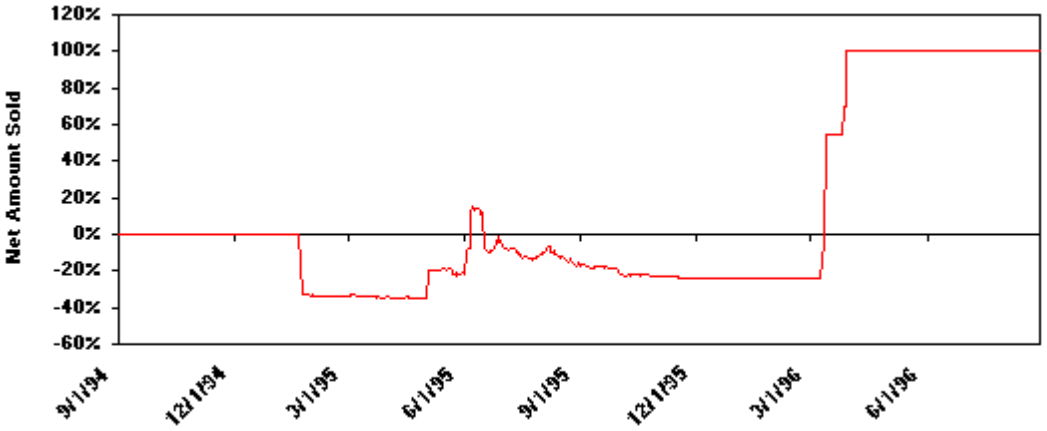
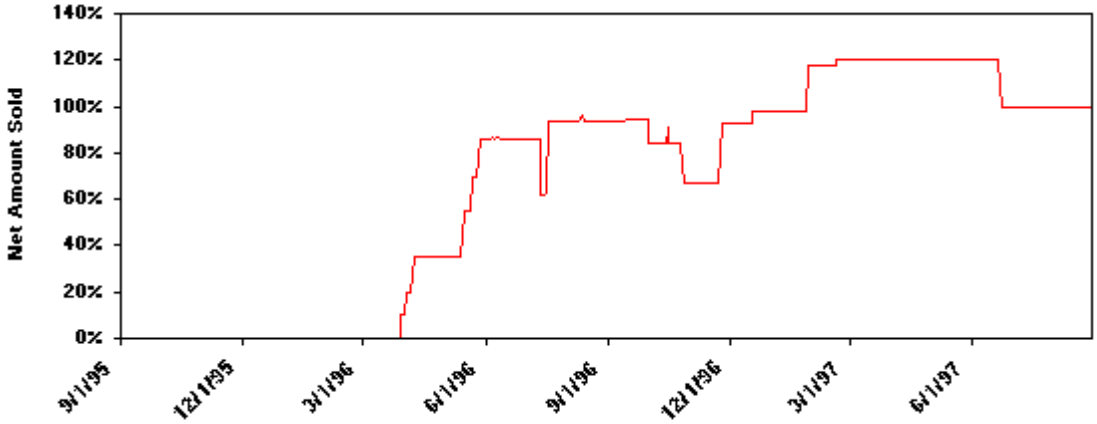


Figure 2. Corn Marketing Profiles for the Brock Hedge Program.

Panel A. 1995 Marketing Period



Panel B. 1996 Marketing Period



Panel C. 1997 Marketing Period

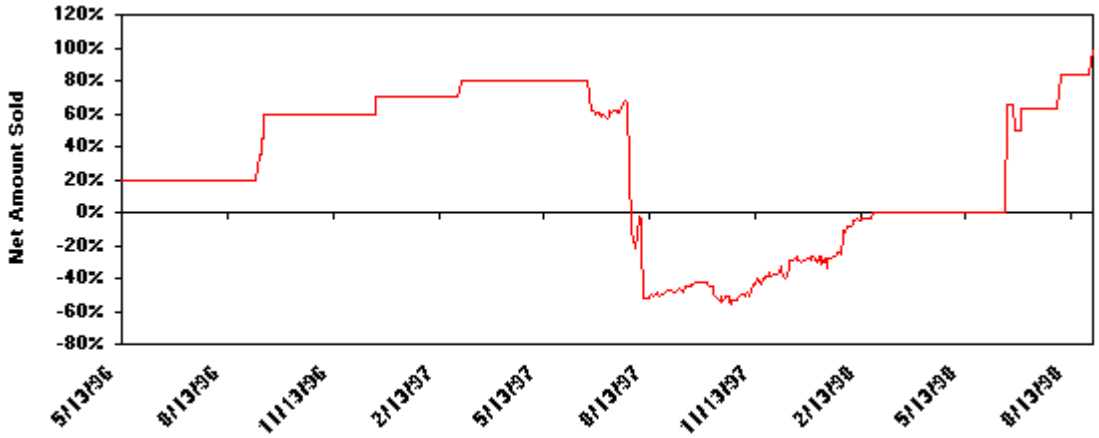


Figure 3. Corn Marketing Profiles for the Ag Resource Program.

Endnotes

[1] When the AgMAS study began in 1994, DTN and FarmDayta were separate companies. The two companies merged in 1996.

[2] This assumption subsequently is relaxed to reflect the growing importance of alternative means of electronic delivery of market advisory services. Beginning in 1997, a service that meets the original two criteria and is available on a "real-time" basis electronically may be included in the sample.

[3] Some of the programs that are depicted as "cash-only" do in fact have some futures-related activity, due to the use of hedge-to-arrive contracts, basis contracts, and some use of options.

[4] There are a few instances where a service clearly differentiates strategies based on the availability of on-farm versus off-farm (commercial) storage. In these instances, recorded recommendations reflect the off-farm storage strategy. Otherwise, services do not differentiate strategies according to the availability of on-farm storage.

[5] The test statistic is $Z = (\bar{p} - 0.5)/\sqrt{0.25/n}$, where $\bar{p}$ is the sample estimate of the proportion and *n* is the number of sample observations. The sampling distribution of *Z* is standard normal.

[6] The test statistic for a null hypothesis of zero average percentage difference is $t = \bar{r}/\left(\hat{\sigma}/\sqrt{n}\right)$ where $\bar{r} = \frac{1}{n}\sum_{i=1}^{n} r_i$, $r_i = \ln(NAP_i / BP)\cdot 100$, NAP_i is the net advisory price for the i^{th} advisory service and *BP* is the market benchmark price for the same commodity and marketing year, and $\hat{\sigma}$ is the estimated standard deviation of the differences across the *n* advisory services in the sample. The *t*-statistic follows a *t*-distribution with *n-1* degrees of freedom.

[7] An important issue is whether the sample observations on net advisory price are independent, both within and across years. The most likely form of dependence is positive correlation, which, if ignored, would cause sample standard deviation estimates across advisory services to be understated. This in turn would cause the statistical significance of hypothesis test results to be overstated. Several possible forms of dependence are tested and rejected. See Irwin, Jackson and Good (1999).

[8] This calculation ignores economies of size that may accrue to larger farms implementing the recommendations. It also ignores contract "lumpiness" problems that may be significant for smaller farms.

[9] Return correlations also are calculated for corn, soybeans and revenue using 20-month and 12-month benchmarks. Results are similar to the 24-month benchmark return correlations and are not presented due to space considerations.

[10] Bartlett's approximation for the standard error ($1/\sqrt{n}$) of the Pearson correlation coefficient (*r*) is employed. The test statistic $Z = r/\sqrt{n}$ approximately follows a standard, normal distribution.

[11] The price increase may be any amount. But, it is worth noting that, strictly speaking, a delta is only valid for "small" price changes in the vicinity of the current price.