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DISCLAIMER

The advisory service marketing recommendations used in this research represent the best efforts of the AgMAS Project staff to accurately and fairly interpret the information made available by each advisory program. In cases where a recommendation is vague or unclear, some judgment is exercised as to whether or not to include that particular recommendation or how to implement the recommendation. Given that some recommendations are subject to interpretation, the possibility is acknowledged that the AgMAS track record of recommendations for a given program may differ from that stated by the advisory service, or from that recorded by another subscriber. In addition, the net advisory prices presented in this report may differ substantially from those computed by an advisory service or another subscriber due to differences in simulation assumptions, particularly with respect to the geographic location of production, cash and forward contract prices, expected and actual yields, carrying charges and government programs.

1998 Pricing Performance of Market Advisory Services for Corn and Soybeans

Executive Summary

The primary purpose of this research report is to present an evaluation of advisory service pricing performance for the 1998 corn and soybean crops. In order to evaluate the returns to the marketing advice produced by the services, the AgMAS Project purchases a subscription to each of the programs offered by a service. The information is received electronically via DTN, world wide web sites or e-mail. Staff members of the AgMAS Project read the information provided by each advisory program on a daily basis. A directory of the advisory programs included in the study can be found at the **Agricultural Market Advisory Services (AgMAS)** Project website (<http://www.aces.uiuc.edu/~agmas/>).

Certain explicit assumptions are made to produce a consistent and comparable set of results across the different advisory programs. These assumptions are intended to accurately depict “real-world” marketing conditions. Several key assumptions are: i) with a few exceptions, the marketing window for the 1998 crops is September 1, 1997 - August 31, 1999, ii) cash prices and yields refer to a central Illinois producer, iii) all storage is assumed to occur off-farm at commercial sites, and iv) marketing loan recommendations made by advisory programs are followed wherever feasible.

The average net advisory price across all 23 corn programs in 1998 is \$2.17 per bushel, seven cents below the market benchmark price. The range of net advisory prices for corn is substantial, with a minimum of \$1.93 per bushel and a maximum of \$2.51 per bushel. The average net advisory price across all 22 soybean programs in 1998 is \$5.82 per bushel, four cents less than the market benchmark. As with corn, the range of net advisory prices for soybeans is substantial, with a minimum of \$5.11 per bushel and a maximum of \$6.58 per bushel. The average revenue achieved by following both the corn and soybean programs offered by an advisory service is \$304 per acre, six dollars less than market benchmark revenue for 1998. The spread in advisory revenue also is noteworthy, with the difference between the bottom- and top-performing advisory programs reaching nearly \$60 per acre.

An advisory program’s net price or revenue received is an important indicator of performance. However, it is the tradeoff between pricing performance and risk that is likely to be of greatest interest to producers. Based on the data available for 1995-1998, a positive tradeoff between average net advisory price and risk is found; producing higher net prices generally requires that an advisory program take on more risk, and *vice versa*. Only one advisory program in corn outperforms the market benchmark when both price and risk are considered. Two do so in soybeans, and none based on revenue. These performance results are somewhat sensitive to the specification of the market benchmark. In addition, it is important to emphasize that the pricing and risk performance results are based on only four observations. This is a small sample for estimating the true risks of market advisory programs. Hence, the return-risk results should be viewed as exploratory rather than definitive.

Introduction to the AgMAS Project

Grain producers operate in a highly uncertain economic environment. The roller coaster movement of corn and soybean prices since 1995 is ample evidence of the uncertainty and risk facing grain producers. In this rapidly changing environment, marketing and risk management play an important role in the overall management of farm businesses. The use of private-sector advisory services has increased over time as producer demand for marketing and risk management advice has increased. Surveys document the high value that many producers place on market advisory services (Patrick and Ullerich; Patrick, Musser, and Eckman; Schroeder, Parcell, Kastens and Dhuyvetter).¹

Despite their current popularity and expected importance in the future, surprisingly little is known about the marketing and risk management strategies recommended by these services and their associated performance. There is a clear need to develop an ongoing "track record" of the performance of these services. Information on the performance of advisory services will assist producers in identifying successful alternatives for marketing and price risk management.

The **Agricultural Market Advisory Services (AgMAS)** Project, initiated in the Fall of 1994, addresses the need for information on advisory services. The project is jointly directed by Dr. Darrel L. Good and Dr. Scott H. Irwin of the University of Illinois at Urbana-Champaign. Correspondence with the AgMAS Project should be directed to: Joao Martines-Filho, AgMAS Project Manager, 434a Mumford Hall, 1301 West Gregory Drive, University of Illinois at Urbana-Champaign, Urbana, IL 61801; voice: (217)333-2792; fax: (217)333-5538; e-mail: agmas@uiuc.edu. The AgMAS Project also has a website that can be found at the following address: <http://www.aces.uiuc.edu/~agmas/>.

Funding for the AgMAS project is provided by the following organizations: American Farm Bureau Foundation for Agriculture; Illinois Council on Food and Agricultural Research; Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture; Economic Research Service, U.S. Department of Agriculture and the Risk Management Agency, U.S. Department of Agriculture.

Purpose of Report

The primary purpose of this research report is to present an evaluation of advisory service pricing performance for the 1998 corn and soybean crops. Specifically, the net price received by a subscriber to an advisory service is calculated for corn and soybean crops harvested in 1998. With a few exceptions, the marketing window for the 1998 crops is September 1, 1997 through

¹ Patrick, G.F. and S. Ullerich. "Information Sources and Risk Attitudes of Large Scale Farmers, Farm Managers, and Agricultural Bankers." *Agribusiness*. 12(1996):461-471.

Patrick, G.F., W.N. Musser, and D.T. Eckman. "Forward Marketing Practices and Attitudes of Large-Scale Midwestern Grain Farmers." *Review of Agricultural Economics*. 20(1998):38-53.

Schroeder, T.C., J.L. Parcell, T.L. Kastens, and K.C. Dhuyvetter. "Perceptions of Marketing Strategies; Farmers vs. Extension Economists." *Journal of Agricultural and Resource Economics*. 23(1998):279-293.

August 31, 1999. Another purpose of this report is to compare the pricing performance results for the 1998 corn and soybean crops with previously released results for the 1995, 1996 and 1997 crop years.

An important point to consider is that the pricing results are available for only four marketing periods. *It is inappropriate to draw too many conclusions from four crop years' results.* A useful analogy is university yield trials for crop varieties. In evaluating the results of crop yield trials, while the results of the most recent year may be of particular interest, firm conclusions about the relative merits of one variety versus another can only be drawn after a number of years of results are available. The same is true for market advisory services.

It is also important to recognize that the performance results in this report emphasize the pricing, or return, element of marketing and risk management. While certainly useful, such results do not address the issue of risk. Two advisory services with the same net price may expose producers to quite different risks through the marketing period. The final section of this report contains a "first look" at the relationship between the pricing performance and risk of advisory services. Since the return-risk results are based on just four years of data, the results must be viewed quite cautiously.

This report has been reviewed by the AgMAS Review Panel, which provides independent, peer-review of AgMAS Project research. The members of this panel are: Henry Bahn, Director of Higher Education Programs with the Cooperative State Research, Education, and Extension Service, US Department of Agriculture; Frank Buerskens, independent agribusiness consultant in Bloomington, Illinois; Renny Ehler, producer in Champaign County, Illinois; Chris Hurt, Professor in the Department of Agricultural Economics at Purdue University; Terry Kastens, Assistant Professor in the Department of Agricultural Economics at Kansas State University and producer in Rawlins County, Kansas; and Robert Wisner, University Professor in the Department of Economics at Iowa State University.

The next section of the report describes the procedures used to collect the data on market advisory service recommendations. The following section describes the methods and assumptions used to calculate the returns to marketing advice. The third section of the report presents 1998 pricing results for corn and soybeans. The fourth section presents a summary of the combined results for the 1995, 1996, 1997, and 1998 marketing periods. The final section presents initial results on the tradeoff between pricing performance and risk of market advisory services.

Data Collection

The market advisory services included in this evaluation do not comprise the population of market advisory services available to producers. 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 the sample of services for the AgMAS Project, criteria

were developed to define an agricultural market advisory service and a list of services was assembled.

The first criterion used to identify services is that a service has to provide marketing advice to producers. 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 producers 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.

A third, and fairly obvious, criterion is that the advice must be transmitted to subscribers before the action is to be taken. This is largely the reason why electronically-delivered services are evaluated. Recommendations that take the form of, "Today would have been a good day to sell," that are received by a subscriber after the market has closed are clearly of little value from a marketing standpoint.

The original sample of market advisory services that met the three criteria was 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.^{2,3} 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 producers.

The total number of advisory programs evaluated for the 1998 marketing period (crop harvested in 1998) is 23 for corn and 22 for soybeans. The term "advisory program" is used because several advisory services have more than one distinct marketing program. Ag Line by

² When the AgMAS study began in 1994, DTN and FarmDayta were separate companies. The two companies merged in 1996.

³ This requirement has been relaxed in recent years 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. Two examples are Utterback Marketing Service, which is carried on a World Wide Web site, and Ag Review, which is available via e-mail. Both are for-pay subscription services.

Doane, Brock Associates, Pro Farmer, and Stewart-Peterson Advisory Services each have two distinct marketing programs, and Agri-Visor has four distinct marketing programs. Allendale provides two distinct programs for corn, but only one for soybeans.

For a variety of reasons, deletions and additions to the sample of advisory programs has occurred over time. Progressive Ag is included in the study for the 1996, 1997 and 1998 marketing periods, but was not included in 1995 because it had not yet come to the project's attention. Utterback Marketing Services is included in 1997 and 1998, but was not included in 1995 or 1996 because its marketing programs were not deemed to be clear enough to be followed by the AgMAS project. Ag Alert for Ontario was included in 1996, but its advice is geared to Canadian producers and was not deemed to be generalizable to U.S. producers, and subsequently was dropped. Grain Field Report, Harris Weather/Elliott Advisory, North American Ag, and Prosperous Farmer were in the study during 1995 and/or 1996, but are not included in 1997 or 1998 because they no longer provide specific recommendations regarding cash sales. Agri-Edge was included in previous reports, but the program was discontinued during the 1997 marketing period. Allendale futures & options and Ag Line by Doane hedge are programs that were introduced for the 1996 marketing period for corn only. The Ag Line by Doane hedge program for soybeans is first tracked for the 1998 marketing period.

Two forms of sample selection biases may be potential problems when assembling an advisory program database. The first form is survival bias, which occurs if only advisory programs 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."⁴ This form of bias should not be present in the AgMAS database of advisory programs because all programs 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 program is added to the database. Statistically, this has the same effect as survivorship bias because data from surviving advisory programs is back-filled. This form of bias should not be present in the AgMAS database because recommendations are not back-filled when an advisory program is added. Instead, recommendations are collected only for the marketing period *after* a decision has been made to add an advisory program to the database.

The actual daily process of collecting recommendations for the sample of advisory programs begins with the purchase of subscriptions to each of the programs. Staff members of the AgMAS Project read the information provided by each advisory program on a daily basis. The information is received electronically, via DTN, web sites or email. For the programs 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 producer-subscriber are simulated in "real-time."

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

⁴ Brown, S. J., W. Goetzmann, R.G.Ibbotson, and S.A.Ross. "Survivorship Bias in Performance Studies." *Review of Financial Studies*. 5(1992):553-580.

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 producers who only wish to make cash sales.⁵ In this situation, both strategies are recorded and treated as distinct strategies to be evaluated.⁶

When a recommendation is made regarding the marketing of corn or soybeans, the recommendation is recorded. In recording recommendations, specific attention is paid to which year's crop is being sold, (e.g., 1998 crop), the amount of the commodity to be sold, which futures or options contract is to be used (where applicable), and any price targets that are mentioned (e.g., sell cash corn when March 1999 futures reach \$2.50). When price targets are given and not immediately filled, such as a stop order in the futures market, the recommendation is noted until the order is either filled or canceled.

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 program. Also, at the completion of the marketing period, it is confirmed whether cash sales total exactly 100 percent, all futures positions are offset, and all options positions are offset or expire worthless.

The final set of recommendations attributed to each advisory program represents the best efforts of the AgMAS Project staff to accurately and fairly interpret the information made available by each advisory program. In cases where a recommendation is considered vague or unclear, some judgment is exercised as to whether or not to include that particular recommendation. This occurs most often when a program suggests "a producer might consider" a position, or when minimal guidance is given as to the quantity to be bought or sold. Given that some recommendations are subject to interpretation, the possibility is acknowledged that the AgMAS track record of recommendations for a given program may differ from that stated by the advisory program, or from that recorded by another subscriber.

Calculating the Returns to Marketing Advice

At the end of the marketing period, all of the (filled) recommendations are aligned in chronological order. The advice for a given marketing period is considered to be complete for each advisory program when cumulative cash sales of the commodity reach 100 percent, all futures positions covering the crop are offset, all option positions covering the crop are either offset or expire, and the advisory program discontinues giving advice for that crop year, such as re-ownership via futures or call options. 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).

⁵ 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.

⁶ There are some 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.

In order to produce a consistent and comparable set of results across the different advisory programs, certain explicit assumptions are made. These assumptions are intended to accurately depict “real-world” marketing conditions.

Geographic Location

The simulation is designed to reflect conditions facing a representative central Illinois corn and soybean producer. Whenever possible, data are collected for the Central Crop Reporting District in Illinois as defined by the National Agricultural Statistics Service (NASS) of the US Department of Agriculture (USDA). The eleven counties (DeWitt, Logan, McLean, Marshall, Macon, Mason, Menard, Peoria, Stark, Tazewell, and Woodford) that make up this District are highlighted in Figure 1.

It should be noted that the relative results of the analysis are likely to be similar if another geographic location is used. The calculated returns to all the trading programs (as well as the benchmark prices) would most likely “shift” due to basis differentials. However, the exact results may differ somewhat for areas outside of central Illinois.

Marketing Window

In general, a two-year marketing window, spanning September 1, 1997 through August 31, 1999, is used in the analysis. The beginning date is selected because it reflects a “realistic” time period in which new crop sales begin. The ending date is selected to be consistent with the ending date for corn and soybean marketing years as defined by the USDA. There are some exceptions to the marketing window definition. Four advisory programs had relatively small amounts (15 percent or less) of cash corn or soybeans unsold as of August 31, 1999. In each of these four cases, the grain was sold in the spot cash market in the first half of September 1999. One advisory program sold 10 percent of corn production using a post-harvest forward contract for delivery in January 2000. Four programs maintained relatively large (40 percent or more) long call “re-ownership” positions for corn and/or soybeans until October or November 1999. Finally, three advisory programs also began pre-harvest hedges prior to September 1, 1997. In all of the previous cases, the actual recommendations on the indicated dates are recorded and used in the analysis.

Prices

The price assigned to each cash sale recommendation is the central Illinois closing, or overnight, bid. The data are collected and reported by the Illinois Department of Ag Market News.⁷ The central Illinois price is the mid-point of the range of bids by elevators in the North Central and South Central Price Reporting Districts, as defined by the Illinois Department of Ag

⁷ The daily prices can be found in *The Wall Street Journal* and at the following website:
http://www.ams.usda.gov/mnreports/GX_GR113.txt.

Market News. Prices in this 25-county area best reflect prices for the assumed geographic location of the representative central Illinois producer (Central Illinois Crop Reporting District).

Pre-harvest cash forward contract prices for Fall delivery are also needed. Pre-harvest bids collected by the Illinois Department of Ag Market News are used when available. The central Illinois pre-harvest price is the mid-point of the daily range of pre-harvest bids by elevators in the North Central and South Central Price Reporting Districts, again, as defined by the Illinois Department of Ag Market News. Pre-harvest forward prices from this source are available for corn and soybeans from February 2, 1998 to September 18, 1998.

Since the marketing window for the 1998 corn and soybean crops begins in September 1997, and the Illinois Department of Ag Market News did not begin to report actual cash forward bids until February 2, 1998, pre-harvest prices need to be estimated for the first few months of the marketing window. For a date between September 1, 1997 and January 30, 1998, a two-step estimation procedure is adopted. First, the forward basis for the period in question is estimated by the average forward basis for the first five days actual forward contract bids are reported by the Illinois Department of Ag Market News (February 2-6, 1998).⁸ Second, the estimated forward basis is subtracted from the settlement price of the Chicago Board of Trade (CBOT) 1998 December corn futures contract or 1998 November soybean futures contract between September 1, 1997 and January 30, 1998. This estimation procedure is expected to be a reasonably accurate reflection of actual forward prices for the early period of the marketing window, as the actual price of the harvest futures contract is used and only the forward basis is estimated.

Some market advisory programs recommended the use of post-harvest forward contracts to sell part of the 1998 corn and soybean crops. The Illinois Department of Ag Market News did report post-harvest bids for January delivery from September 22, 1998 to December 14, 1998. These bids for central Illinois are used wherever applicable. However, most of the positions recommended by advisory programs either did not match the January delivery period or were made after the Illinois Department of Ag Market News stopped reporting post-harvest forward contract prices. The following procedure is adopted to estimate the additional post-harvest forward contract prices needed in the analysis. First, three elevators in central Illinois who agreed to supply data on spot and forward contract prices on the dates when advisors made such recommendations were contacted. Each of these elevators is in a different county in the Central Illinois Crop Reporting District (Logan, McClean, DeWitt). Second, the spread between each elevator's forward price and spot price is calculated for the relevant date. Third, the forward spread is averaged across the three elevators for the same date. Fourth, the average forward spread from the three elevators is added to the central Illinois cash price (discussed at the beginning of the section) to arrive at an estimated post-harvest forward contract price for central Illinois.

The fill prices for futures and options transactions generally are the prices reported by the programs. In cases where a program did not report a specific fill price, the settlement price for

⁸ The average forward basis (futures-forward) over February 2-6, 1998 was \$0.1920 per bushel for corn and \$0.2075 per bushel for soybeans.

the day is used. This methodology does not account for liquidity costs in executing futures and options transactions.⁹

Quantity Sold

Since most of the advisory program recommendations are given in terms of the proportion of total production (e.g., “sell 5 percent of 1998 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 period 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.

The above procedure implicitly assumes that the “lumpiness” of futures and/or options contracts is not an issue. Lumpiness is caused by the fact that futures contracts are for specific amounts, such as 5,000 bushels per CBOT corn futures contract. For large-scale producers, it is unlikely that this assumption adversely affects the accuracy of the results. This may not be the case for small- to intermediate-scale producers who are less able to sell in 5,000 bushel increments.¹⁰

Yields and Harvest Definition

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 likely to be a function of yield in previous years. In this study, the assumed yield prior to harvest is the calculated trend yield, while the actual reported yield is used from the harvest period forward. The expected yield is based upon a linear regression trend model of actual yields from 1972 through 1997 for the Central Illinois Crop Reporting District. Previous research suggests a regression trend model produces relatively accurate yield forecasts.¹¹

In central Illinois, the expected 1998 yield for corn is calculated to be 143.2 bushels per acre (bpa). Therefore, recommendations regarding the marketing quantity made prior to harvest, are based on yields of 143.2 bpa. For example, a recommendation to forward contract 20 percent of expected 1998 production translates into a recommendation to contract 28.6 bpa (20 percent of

⁹ Liquidity costs reflect the fact that non-floor traders must buy at the ask price and sell at the bid price. The difference between the bid and ask prices, termed the bid-ask spread, is the return earned by floor traders for “making the market.”

¹⁰ The practical importance of “lumpiness” problems even for small farms may be limited, due to the availability of “mini-contracts” at the Mid-America Exchange. These futures and options contracts are specified in 1,000 bushel increments.

¹¹ Fackler, P.L., D.L. Young, and G.A. Carlson. “Estimates of Trend and Variability Patterns in U.S. Crop Yields,” in *Quantifying Long Run Agricultural Risks and Evaluating Farmers’ Responses to Risk*. Proceedings of a seminar sponsored by the Southern Regional Project S-252, Jekyll Island, Georgia, March 1993.

143.2). The actual reported corn yield in central Illinois in 1998 is 149.0 bpa. The same approach is used for soybean evaluations. The calculated 1998 trend yield for soybeans in central Illinois is 47.0 bpa, and the actual yield in 1998 is 49.0 bpa.

It is assumed that after harvest begins producers have a reasonable idea of what their actual realized yield will be. Since harvest occurs at different dates each year, estimates of harvest progress as reported by NASS in central Illinois are used. Harvest progress estimates typically are not made available soon enough to identify precisely the beginning of harvest, so an estimate is made based upon available data. Specifically, the date on which 50 percent of the crop is harvested is defined as the "mid-point" of harvest. The entire harvest period then is defined as a five-week window, beginning two and one-half weeks before the harvest mid-point, and ending two and one-half weeks after the harvest mid-point. In most years, a five-week window will include at least 80 percent of the harvest.

For 1998, the harvest period for corn is defined as September 23, 1998 through October 28, 1998. For soybeans, the harvest period is September 17, 1998 through October 22, 1998. Therefore, for corn, recommendations made after September 22 are applied on the basis of the actual yield of 149.0 bpa. For soybeans, recommendations made after September 16 are applied on the basis of the actual yield of 49.0 bpa.

The issue of changing yield expectations typically is not dealt with in the recommendations of the advisory programs. For the purpose of this study, the actual harvest yield must exactly equal total cash sales of the crop at the end of the marketing time frame. Hence, an adjustment in yield assumptions from expected to actual levels must be applied to cash transactions at some point in time. In this analysis, an adjustment is made in the amount of the first cash sale made after the beginning of the harvest period. For example, if a program advises forward contracting 50 percent of the corn crop prior to harvest, this translates into sales of 71.6 bpa (50 percent of 143.2). However, when the actual yield is applied to the analysis, sales-to-date of 71.6 bpa imply that only 48.1 percent of the actual crop has been contracted. In order to compensate, the amount of the next cash sale is adjusted to align the amount sold. In this example, if the next cash sale recommendation is for a 10 percent increment of the 1998 crop, making the total recommended sales 60 percent of the crop, the recommendation is adjusted to 11.95 percent of the actual yield (17.8 bushels), so that the total crop sold to date is 60 percent of 149.0 bushels per acre ($71.6 + 17.8 = 89.4 = 0.6 * 149.0$). After this initial adjustment, subsequent recommendations are taken as percentages of the 149.0 bpa actual yield, so that sales of 100 percent of the crop equal sales of 149.0 bpa.

While the amount of cash sales is adjusted to reflect the change in yield information, a similar adjustment is not made for futures or options positions that are already in place. For example, assume that a short futures hedge is placed in the December 1998 corn contract for 25 percent of the 1998 crop prior to harvest. Since the amount hedged is based on the trend yield assumption of 143.2 bpa, the futures position is 35.8 bpa (25 percent of 143.2). After the yield assumption is changed, this amount represents a short hedge of 24.03 percent ($35.8/149.0$). The amount of the futures position is not adjusted to move the position to 25 percent of the new yield

figure. However, any futures (or options) positions recommended after the beginning of harvest are implemented as a percentage of the actual yield.

Brokerage Costs

Brokerage costs are incurred when producers open or close positions in futures and options markets. For the purposes of this study, it is assumed that brokerage costs are \$50 per contract for round-turn 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.

LDP and Marketing Assistance Loan Payments

While the 1996 “Freedom-to-Farm” Act did away with government set-aside and target price programs, price protection for producers in program crops such as corn and soybeans was not eliminated entirely. Minimum prices are established through a “loan” program.¹² Specifically, if market prices are below the Commodity Credit Corporation (CCC) loan rate for corn or soybeans, producers can receive payments from the US government that make up the difference between the loan rate and the lower market price. There is considerable flexibility in the way the loan program can be implemented by producers. This flexibility presents the opportunity for advisory programs to make specific recommendations for the implementation of the loan program. Additionally, the prices of both corn and soybeans were below the loan rate during significant periods of time in the 1998-1999 marketing year, so that use of the loan program was an important part of marketing strategies. As a result, net advisory program prices may be substantially impacted by the way the provisions of the loan program are implemented.

Most of the advisory programs tracked by the AgMAS project for the 1998 crop make specific recommendations regarding the timing and method of implementing the loan program for the entire corn and soybean crops.¹³ These recommendations are implemented as given wherever feasible. Several decision rules have to be developed even in this case, in particular, for pre-harvest forward contracts. For a few programs, loan recommendations are incomplete or not made at all. For these cases, it is necessary to develop a more complete set of decision rules for implementing the loan program in the marketing of corn and soybeans. All loan-related decision rules are based on the assumption of a “prudent” or “rational” producer, within the context of the intent of the loan program. More specifically, it is assumed that a producer will take advantage of the price protection offered by the loan program, even in the absence of specific advice from an advisory program.

¹² For a complete description of the programs discussed in this section, see the following Farm Service Agency fact sheets: *Nonrecourse Marketing Assistance Loans and Loan Deficiency Payments*, March 1998; *Feed Grains*, March 1998; and *Soybeans and Minor Oilseeds*, July 1998. These can be found at <http://www.fsa.usda.gov/pas/publications/facts/pubfacts.htm>.

¹³ Seventeen of the 23 corn programs make a complete set of marketing loan recommendations (100 percent of actual production) for the 1998 crop. Eighteen of the 22 soybean programs make a complete set of marketing loan recommendations.

Before describing the decision rules, it is useful to provide a brief overview of the loan program mechanics. Then, the rules developed to implement the loan program in the absence of specific recommendations can be described more effectively.

Program Mechanics

There are two mechanisms for implementing the price protection benefits of the loan program. The first mechanism is the loan deficiency payment (LDP) program. LDPs are computed as the difference between the loan rate for a given county and the posted county price (PCP) for a particular day. PCPs are computed by the USDA and change each day in order to reflect the “average” market price that exists in the county. For example, if the county loan rate for corn is \$2.00 per bushel and the PCP for a given day is \$1.50 per bushel, then the next day LDP is \$0.50 per bushel. If the PCP increases the next day to \$1.60 per bushel, the next day LDP will decrease to \$0.40 per bushel. Conversely, if the PCP decreases the next day to \$1.40 per bushel, the next day LDP will increase to \$0.60 per bushel.¹⁴

LDPs are made available to producers over the period beginning with corn or soybean harvest and ending May 31st of the calendar year following harvest. Producers have flexibility with regard to taking the LDP. They may simply elect to take the payment when the crop is sold in a spot market transaction (before the end of May in the particular marketing year). Or, producers can choose to take the LDP before the crop is delivered and sold. Note that LDPs for the 1998 crop cannot be taken after a crop has been delivered and title has changed hands.

The second mechanism is the nonrecourse marketing assistance loan program. A loan cannot be taken on any portion of the crop for which an LDP has been received. Under this program, producers may store the crop (on the farm or commercially), maintain beneficial interest, and receive a loan from the CCC using the stored crop as collateral. The loan rate is the established rate in the county where the crop is stored and the interest rate is established at the time of loan entry. Corn and soybean crops can be placed under loan anytime after the crop is stored through May 31st of the following calendar year. The loan matures on the last day of the ninth month following the month in which the loan was made.

Producers may settle outstanding loans in two ways: i) repaying the loan during the 9-month loan period, or ii) forfeiting the crop to the CCC at maturity of the loan. Under the first alternative, the loan repayment rate is the lower of the county loan rate plus accrued interest or the marketing loan repayment rate, which is the PCP. If the PCP is below the county loan rate, the economic incentive is to repay the loan at the posted county price. The difference between the loan rate and the repayment rate is a marketing loan gain (MLG). If the PCP is higher than the loan rate, but lower than the loan rate plus accrued interest, the incentive is also to repay the loan at the PCP. Interest is charged on the difference between the PCP and the loan rate. If the PCP is higher than the loan rate plus accrued interest, the incentive is to repay the loan at the loan rate plus interest.

¹⁴ Technically, PCPs for a given day are used by the USDA to compute LDPs for the following day.

Under the second alternative, the producer stores the crop to loan maturity and then transfers title to the CCC. The producer retains the proceeds from the initial loan. This was generally not an attractive alternative in the 1998 marketing year since the PCP was often below the cash price of corn and soybeans. Repaying the loan at the PCP and selling the crop at the higher cash price was economically superior to forfeiture.

The nonrecourse loan program establishes the county loan rate as a minimum price for the producer, as does the LDP program. For the 1998 crop, the sum of LDPs plus marketing loan gains was subject to a payment limitation of \$75,000 per person. Forfeiture on the loans provided the mechanism for receiving a minimum of the loan rate on bushels in excess of the payment limitation.

The average loan rates for the 1998 corn and soybean crops across the eleven counties in the Central Illinois Crop Reporting District (DeWitt, Logan, McLean, Macon, Marshall, Mason, Menard, Peoria, Stark, Tazewell, and Woodford) are \$1.95 and \$5.42 per bushel, respectively. Market prices fell below these loan rates for extended periods of time during the 1998 marketing year. This is reflected in Figure 2, which shows the corn and soybean LDP or MLG rates for central Illinois during the 1998 marketing year.^{15, 16} For corn, LDPs or MLGs are relatively high during harvest, varying from 10 cents to 30 cents per bushel, and then fall to zero or near zero during winter and spring. As cash corn prices fell during the summer of 1999, corn marketing loan gains increased rapidly and remained at relatively high levels. Soybean LDPs or marketing loan gains generally moved upwards over the course of the 1998 marketing year, starting at about 40 cents per bushel during harvest and peaking at \$1.60 per bushel during the following summer.

Decision Rules for Programs with a Complete Set of Loan Recommendations

If an advisory program makes a complete set of loan recommendations, the specific advice is implemented wherever feasible. However, specific decision rules are still needed regarding pre-harvest forward contracts because it is possible for an advisory program to recommend taking the LDP on those sales before it is actually harvested and available for delivery in central Illinois. To begin, it is assumed that amounts sold for harvest delivery with pre-harvest forward contracts are delivered first during harvest. Since LDPs must be taken when title to the grain changes hands, LDPs are assigned as these “forward contract” quantities are harvested and delivered. This necessitates assumptions regarding the timing and speed of harvest. Earlier it was noted that a five-week harvest window is used to define harvest. This window is centered on the day nearest to the mid-point of harvest progress as reported by NASS. Various assumptions could be implemented regarding harvest progress during this window.

¹⁵ LDP and MLG data were obtained from the Farm Services Agency of the USDA via a Freedom of Information Act request.

¹⁶ The time period for each chart begins on the first day of harvest, as determined for this study, and ends on August 31, 1999. The first day of corn harvest is assumed to be September 23, 1998. The first day of soybean harvest is assumed to be September 17, 1998.

Lacking more precise data, a reasonable assumption is that harvest progress for an individual, representative farm is a linear function of time.

Tables 1 and 2 summarize the information used to assign LDPs to pre-harvest forward contracts. The second column shows the amount harvested assuming a linear model. The third column shows the LDP available on each date of the harvest window and the third column presents the average LDP through each harvest date. An example will help illustrate use of the tables. Assume that an advisory program recommends, at some point before harvest, that a producer forward contract 50 percent of expected soybean production. This translates into 23.5 bpa when the percentage is applied to expected production ($0.50 \times 47.0 = 23.5$). Next, convert the bpa to a percentage of actual production, which is 48 percent ($23.5 / 49.0 = 48$). To determine the LDP payment on the 48 percent of actual production forward contracted, simply read down Table 2 to 10/02/98, which is the date when 48 percent of harvest is assumed to be complete. The average LDP up to that date (09/17/98-10/02/98) is \$0.48 per bushel. This is the LDP amount assigned to the forward contract bushels.

Note that LDPs for any sales (spot, forward contracts, futures or options) recommended during harvest are taken only after all forward contract obligations are fulfilled. In addition, crops placed under loan by an advisory program do not accumulate interest opportunity costs because proceeds from the loan can be used to offset interest costs that otherwise would accumulate.

*Decision Rules for Programs with a Partial Set of Loan Recommendations
or No Loan Recommendations*

If an advisory program makes a partial set of loan recommendations, the available advice is implemented wherever feasible. In the absence of specific recommendations, it is assumed that crops priced before May 31, 1999 are not placed under loan. Those crops receive program benefits through LDPs. After May 31, 1999, eligible crops (unpriced crops for which program benefits have not yet been collected) are assumed to be under loan until priced.

In the absence of specific recommendations, rules for assigning LDPs and MLGs are developed under the assumption that loan benefits are established when the crop is priced or as soon after pricing that is allowed under the rules of the program. This principle is consistent with the intent of the loan program to fix a minimum price when pricing decisions are made. Two rules are most important in the implementation of this principle. First, LDP's on pre-harvest sales (forward contracts, futures or options) are established as the crop is harvested. Second, if the LDP or MLG is zero on the pricing date, or the first date of eligibility to receive a loan benefit, those values are assigned on the first date when a positive value is observed, assuming a beneficial interest in that portion of the crop has been maintained. Specific rules for particular marketing tools and situations follow:

- 1) *Pre-harvest forward contracts.* The same decision rules are applied as discussed in the previous section. Specifically, it is assumed that amounts sold for harvest delivery with pre-harvest forward contracts are delivered first during harvest. LDPs, if positive, are

assigned as these “forward contract” quantities are harvested and delivered. This necessitates assumptions regarding the timing and speed of harvest. A linear model of harvest progress is assumed in the five-week harvest window. The specific information used to assign LDPs to pre-harvest forward contracts is again found in Tables 1 and 2. As a final point, note that LDPs for any other sales (spot, futures or options) recommended during harvest are taken only after all pre-harvest forward pricing obligations are fulfilled.

- 2) *Pre-harvest short futures.* Pre-harvest pricing using futures contracts is treated in the same manner as pre-harvest forward contracts. LDPs are assigned on open futures positions as the crop is harvested, or as soon as a positive LDP is available, if the futures position is still in place and cash sales have not yet been made. These are assigned after forward contracts have been satisfied. If the underlying crop is sold before there is a positive LDP, then that portion of the crop receives a zero LDP. During the harvest window, if the futures position is offset before a positive LDP is available and the crop has not yet been sold in the cash market, that portion of the crop is eligible for loan benefits on the next pricing recommendation.
- 3) *Pre-harvest put option purchases.* Long put option positions, which establish a minimum futures price, are treated in the same manner as pre-harvest short futures.
- 4) *Post-harvest forward contracts.* The main issue with respect to post-harvest forward contracts is when to assign the LDPs or MLGs. Those can be established on the date the contract is initiated, on the delivery date of the contract, or anytime in between. Following the general principle outlined earlier, LDPs and MLGs for post-harvest contracts are assigned on the date the contract is initiated or the first day with positive benefits prior to delivery on the contract.
- 5) *Post-harvest short futures.* As with post-harvest forward contracts, the main issue with post-harvest short futures positions is when to assign loan benefits. These are assigned when the short futures position is initiated or as soon as a positive benefit is available if the futures position is still in place and cash sales have not been made. If the underlying crop is sold before a positive LDP is available, that portion of the crop receives a zero LDP. If the short futures position is offset before a positive LDP is available and the cash crop has not yet been sold, that portion of the crop is eligible for loan benefits on the next pricing recommendation.
- 6) *Post-harvest long put positions.* Long put option positions established after the crop is harvested are treated in the same manner as post-harvest short futures
- 7) *Spot sales before May 31, 1999.* If a spot cash sale of corn or soybeans is recommended before May 31, 1999, it is assumed that the LDP, if positive, is established that same day.
- 8) *Loan program after May 31, 1999.* Since LDPs are not available after May 31, 1999, it is assumed that any corn or soybeans in storage and not priced as of this date, for which loan benefits have not been established, are entered in the loan program on that date. This is a

reasonable assumption since spot prices are below the loan rate for both corn and soybeans in central Illinois on May 31 and a prudent producer would take advantage of the price protection offered by the loan program. When the crops are subsequently priced (cash sale, forward contract, short futures, or long put option), the marketing loan gain, if positive, is assigned on that day. Forfeiture is not an issue for these bushels because all cash sales were made before the end of nine-month loan period (February 28, 2000). Note also that the \$75,000 payment limitation is not considered in the analysis, as production is based on one acre of corn and/or soybeans.

Carrying Charges

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.¹⁷ This is assumed for several reasons. First, commercial storage costs reflect the full economic costs of physical storage, whereas on-farm storage cost estimates may not, due to differing accounting methods and/or time horizons. Second, commercial storage costs are relatively consistent across producers in a given area, whereas on-farm storage costs likely vary substantially among producers. Third, commercial storage cost data are readily available, whereas this is not the case for on-farm storage.

Storage charges are assigned beginning October 29 for corn and October 23 for soybeans, the first dates after the end of the respective harvest windows. 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 for the 1998 crop quoted in a telephone survey of nine central Illinois elevators.

The interest rate is assumed to be 8.6 percent per year, and is applied to the average harvest-time price for each crop. This interest rate is the average rate for all commercial agricultural loans for the fourth quarter of 1998 and the first three quarters of 1999 as reported in the *Agricultural Finance Databook* published by the Board of Governors of the Federal Reserve Board. The interest charge for storing grain is the interest rate compounded daily from the end of harvest to the date of sale.¹⁸

¹⁷ As mentioned earlier in this report, there are some 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.

¹⁸ The daily interest rate, r , is computed as follows:

$$r = (1.086)^{\frac{1}{365}} - 1 = 0.0002261 \text{ or } 0.02261 \text{ percent per day .}$$

In addition to the storage and interest costs, another charge is assigned to corn (but not soybeans) that goes into commercial storage. 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. Given that the harvest-time cash price in central Illinois for 1998 is \$1.91 per bushel, the charge for volume reduction is 2.5 cents per bushel ($\$1.91 * 0.013$). Therefore, the flat shrink charge assigned to all stored corn is 4.5 cents per bushel.¹⁹

It should be noted that the cost of drying corn down to 15 percent moisture and the cost of drying soybeans to storable moisture are not included in the calculations. This cost is incurred whether or not the grain is stored or sold at harvest, or whether the grain is stored on-farm or off-farm.

The calculation of carrying charges may be impacted by an advisory program’s loan recommendations and/or the decision rules discussed in the previous section. Specifically, during the period corn or soybeans are placed under loan, interest costs are not accumulated, as the proceeds from the loan can be used to offset interest opportunity costs that otherwise would accumulate. This most commonly occurs after May 31, 1999, when it is assumed that all unpriced grain is placed under loan until priced. If a crop is priced (forward contracts, futures or options) while under loan but stored beyond the time of pricing, interest opportunity costs are accumulated from the day of pricing until the time storage ceases (since it is assumed the loan is repaid on the date of pricing).

Finally, it could be argued that interest opportunity costs should be charged based on the LDP available at harvest but not taken by an advisory program. This adjustment is not made for two reasons. First, it would not substantially impact the results due to the small interest opportunity costs involved. Second, anecdotal evidence suggests that there was considerable delay in LDP payments actually reaching producers, with lags of several months apparently not uncommon.

Benchmark Prices

In addition to comparing the net price received across advisory programs, it is useful to compare the results to simple market benchmark prices. These prices are intended to provide information about the actual prices that are available for a particular crop, and provide an indication of how producers might fare using some basic marketing strategies that do not require professional marketing advice.

¹⁹ Note that the shrink charge is not applied to corn that is sold via a pre-harvest forward contract or harvest spot sale.

Conceptually, a useful benchmark should: i) be *simple* to understand and to calculate; ii) represent the returns to a marketing strategy that could be *implemented* by producers; iii) be directly *comparable* to the net advisory price received from following the recommendations of a market advisory program; iv) not be a function of the actual recommendations of the advisory programs or of the actual marketing behavior of producers, but rather should be *external* to their marketing activities; and v) be *stable*, so that it represents the range of prices made available by the market throughout the marketing period instead of representing the price during a small segment of the marketing period.

In the 1995 and 1996 AgMAS corn and soybean pricing performance reports, two market benchmark prices are reported: the average harvest-period price in central Illinois and the average price received by Illinois producers (as reported by USDA). However, research conducted by the AgMAS Project indicates that these benchmarks have some weaknesses that make them less than ideal indicators of the price offered by the market for a given crop.²⁰ The harvest cash price only includes prices during a small portion of the entire period over which the crop could be marketed. In certain years, this price may not fairly represent the true range of prices available. The calculation of the harvest cash price also can be sensitive to the specific time period selected as the harvest period. The average price received by Illinois producers is not directly comparable to the net advisory price as calculated in this study because the average price received includes price discounts that are incurred because some grain marketed is of substandard quality, while the AgMAS Project assumes that all grain marketed meets the requirements of No. 2 yellow corn or No. 1 soybeans.

In the 1997 AgMAS corn and soybean pricing performance report, a new market benchmark price is introduced: the average cash price stated on a harvest equivalent basis for corn and soybeans over the entire marketing period. For the 1998 crop, the benchmark is based on the average price over the 1998 marketing period, which began on September 1, 1997 and ended on August 31, 1999. Cash forward prices for central Illinois are used during the 1998 pre-harvest period, while daily spot prices for central Illinois are used for the 1998 post-harvest period. The same forward and spot price series applied to advisory program recommendations are used to construct the benchmark. Details on the forward and cash price series can be found in the earlier “Prices” section of this report.

The average cash price benchmark meets all of the selection criteria listed above, except it cannot be easily implemented by producers since it involves marketing a small portion of each crop every day of the two-year marketing window. It can be shown, though, that the price realized via a more manageable strategy of routinely selling twelve times during the marketing window very closely approximates the average cash price. Therefore, it is determined that the average cash price meets all five selection criteria and is the most appropriate market benchmark to be used in evaluating the pricing performance of market advisory programs.

²⁰ A full discussion of the selection of the appropriate market benchmark price can be found in Good, D.L., S.H. Irwin and T.E. Jackson., “Development of a Market Benchmark Price for AgMAS Performance Evaluations,” AgMAS Project Research Report 1998-02, December 1998, which can be obtained at the AgMAS website (<http://www.aces.uiuc.edu/~agmas/>).

Three 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. The first is to take a weighted average price, to account for changing yield expectations, instead of taking the simple average of the daily prices. This adjustment is consistent with the procedure described previously in the "Expected Yield" section. 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 is to compute post-harvest cash prices on a harvest equivalent basis, which is done by subtracting carrying charges (storage, interest and shrink) from post-harvest spot cash prices. The daily carrying charges are calculated in the same manner as those for net advisory prices.

A third adjustment to the average cash price benchmark is new with the 1998 report. In the context of evaluating advisory program recommendations, it was argued earlier that a "prudent" or "rational" producer will take advantage of the price protection offered by the loan program, even in the absence of specific advice from an advisory program. This same logic suggests that a "prudent" or "rational" producer will take advantage of the price protection offered by the loan program when following the benchmark average price strategy. Based on this argument, the average cash price benchmark is adjusted by the addition of LDPs and MLGs. Bushels marketed in the pre-harvest period according to the benchmark strategy (approximately 53 percent) are treated as forward contracts with the LDPs assigned at harvest. Bushels marketed each day in the post-harvest period (approximately 47 percent) are awarded the LDP or MLG in existence for that particular day. Finally, just as in the case with comparable advisory program recommendations, interest opportunity costs are not charged to the benchmark after May 31, 1999 to reflect the assumption that stored grain is placed under loan.

1998 Pricing Performance Results for the Advisory Programs

Pricing performance results for the 1998 corn and soybean crops are presented in Tables 3 through 5 and Figures 3 and 4. For a specific example of how the marketing recommendations are translated into a final net advisory price that incorporates the aforementioned parameters, please refer to the 1996 AgMAS Pricing Report.²¹

The program-by-program results of the evaluation of corn marketing programs are contained in Table 3. This table shows the breakout of the components of the net advisory price as well as the net advisory price itself. The 1998 average net advisory price for all 23 corn programs is \$2.17 per bushel. It is computed as the unadjusted cash sales price (\$2.15 per bushel) minus carrying charges (\$0.19 per bushel) plus futures and options gain (\$0.04 per bushel) minus brokerage costs (\$0.02 per bushel) plus LDP/MLG gain (\$0.18 per bushel).²² The

²¹Jackson, T.E., S.H. Irwin and D.L. Good. "1996 Pricing Performance of Market Advisory Services for Corn and Soybeans" AgMAS Project Research Report 1998-01, January 1998, pp. 10-13. This report is available on the AgMAS website (<http://www.aces.uiuc.edu/~agmas/>).

²² The components due not sum exactly to the average net advisory price due to rounding.

average net advisory price for corn is seven cents below the market benchmark price. The range of net advisory prices for corn is fairly large, with a minimum of \$1.93 per bushel and a maximum of \$2.51 per bushel.

Table 4 lists the program-by-program results of the soybean evaluations. The 1998 average net advisory price for all 22 soybean programs is \$5.82 per bushel. It is computed as the unadjusted cash sales price (\$5.42 per bushel) minus carrying charges (\$0.19 per bushel) plus futures and options gain (\$0.12 per bushel) minus brokerage costs (\$0.01 per bushel) plus LDP/MLG gain (\$0.49 per bushel). The average net advisory price for soybeans is four cents per bushel below the market benchmark price. As with corn, the range of net advisory prices for soybeans is substantial, with a minimum of \$5.11 per bushel and a maximum of \$6.58 per bushel.

A point to consider when examining Tables 3 and 4 is the impact of the assumption that all storage occurs off-farm. It is possible to argue that short-run marginal costs of on-farm grain storage is zero if the facilities already exist and variable costs associated with handling grain and maintaining grain quality are not included. Excluding the costs of commercial storage entirely (but continuing to subtract interest costs), the average net advisory price for corn increases to \$2.32 per bushel and the net advisory price for soybeans increases to \$5.92²³ per bushel. The calculation of the market benchmark price also is impacted by such a change in the storage cost assumption, with the market benchmark price rising to \$2.35 per bushel for corn and \$5.95 per bushel for soybeans. Therefore, if physical storage charges are assumed to be zero, the average net advisory price for both corn and soybeans is three cents below the market benchmark price. Hence, there is only a minimal impact of changing storage assumptions on the pricing results.

Since many Corn Belt producers grow both corn and soybeans, it also is useful to examine a combination of the results for the corn and soybean marketing programs. In order to do this, gross revenue is calculated for a central Illinois producer who follows both the corn and soybean marketing advice of a given program. It is assumed that the representative producer splits production equally (50/50) between corn and soybeans and achieves corn and soybean yields equal to the actual yield for the area in 1998. The 50/50 advisory revenues are computed on a per acre basis and compared with the revenue a central Illinois producer could have received based on the market benchmark price for both corn and soybeans. Advisory revenue per acre is calculated only for those programs that offer both corn and soybean marketing advice.

Table 5 lists the program-by-program results of the 50/50 revenue analysis. The average revenue achieved by following both the corn and soybean programs offered by an advisory program is \$304 per acre, \$6 per acre less than market benchmark revenue for 1998 marketing period. The spread in advisory revenue also is noteworthy, with the difference between the bottom- and top-performing advisory programs nearly reaching \$60 per acre.

²³ These alternative net prices are computed as,
\$2.32 per bushel = \$2.17 (average net advisory price) + \$0.12 (average advisory storage cost) + \$0.03 (average advisory shrink cost)
\$5.92 per bushel = \$5.82 (average net advisory price) + \$0.10 (average advisory storage cost)

For comparison purposes, the annual subscription cost of each advisory program also is listed in Table 5. Subscription costs average \$295 per program, about equal to the average advisory revenue for one acre of production, split 50/50 between corn and soybeans. Subscription costs do not appear to be large relative to total farm revenue, whether a large or small farm is considered. For a 1,000 acre farm, subscription costs average about one-tenth of one percent of total advisory revenue. For a 250 acre farm, subscription costs average about three-tenths of one percent of total advisory revenue. Note that subscription costs are not subtracted from any of the revenue figures presented in Table 5.

The distribution of the net advisory prices is illustrated in Figure 3. Of the 23 marketing programs for corn, 7 programs achieved a net price that is within (plus or minus) 5 cents of the market benchmark price of \$2.24 per bushel. Three of the advisory programs achieve a net price 6 to 16 cents higher than the market benchmark price, and one program achieves a net price of more than 16 cents above the market benchmark. Eleven programs are grouped in a range between 6 and 27 cents below the market benchmark price, with one program more than 27 cents below the market benchmark.

For soybeans, ten of the advisory programs are within (plus or minus) 15 cents per bushel of the market benchmark price of \$5.86 per bushel. Three of the advisory programs achieve a net price between 16 to 46 cents higher than the market benchmark price, and two programs achieve a net price of more than 46 cents above the market benchmark. Five programs are grouped in a range between 16 and 46 cents below the market benchmark price, with two programs more than 46 cents below the market benchmark.

In terms of revenue, 4 of the 22 programs achieve revenue per acre within (plus or minus) \$5 per acre of the market benchmark revenue. Three programs achieve revenue that is between \$6 and \$16 per acre above the market benchmark revenue, while an additional three programs achieve revenue more than \$16 above the market benchmark revenue. Ten programs achieve revenue that is between \$6 and \$26 per acre below market benchmark revenue. Three programs generate revenue that is more than \$26 per acre less than benchmark revenue.

Another view of the pricing performance of the advisory programs is shown in Figure 4. Here, net advisory prices or revenues are ranked from highest to lowest and plotted versus the market benchmark. As shown in the top chart, 7 of the 23 corn marketing programs achieve a net price that is equal to or higher than the market benchmark price. As reported in the middle chart, 7 of the 22 soybean programs achieve a net advisory price equal to or higher than the market benchmark price. The bottom chart shows the comparison between 50/50 advisory revenue and the revenue implied by market benchmark prices. Advisory revenue is greater than the market benchmark revenue for seven of the programs. Note that the same advisory programs do not necessarily exceed the market benchmarks in each of the comparisons in Figure 4.

Figure 5 shows the pattern of corn prices for the 1998 marketing window. The top chart shows daily cash prices from September 2, 1997 through August 31, 1999. The pre-harvest prices are the forward contract prices for harvest delivery. The middle chart is a repeat of the top chart with daily loan deficiency (LDP) or marketing loan gains (MLG) added to the daily price. For the

pre-harvest period, the LDP is the average LDP available at harvest time. The third chart offers a different perspective, in that during the post-harvest period the daily cash price is adjusted for cumulative carrying costs (shrink, interest, and storage charges). The chart illustrates the pattern of harvest equivalent prices plus LDP or MLG.

Prices for the 1998/99 crop were highest in the pre-harvest period, with the cash forward contract price remaining above \$2.50 per bushel until April 1998. Prices declined sharply into harvest as a large crop materialized, made a classic post-harvest recovery as the basis appreciated, and then remained stable during the winter and spring of 1999. New lows were made in the summer of 1999 on the basis of the prospects for another large harvest. The price pattern was typical for a large crop year followed by another large crop.

LDPs were positive at harvest time, but cash prices moved above the Commodity Credit Corporation (CCC) loan rate in the winter and early spring months. Marketing loan gains were large in July. When adjusted for carrying costs, prices declined slightly during the winter and spring and moved to extremely low levels in July 1999. The price pattern for the 1998 crop favored those who made early pre-harvest sales and penalized those who stored a large portion of the crop unpriced late into the marketing year.

Figure 6 shows the pattern of soybean prices for the 1998 marketing window. The three charts are the same as for corn, depicting daily cash prices, cash prices plus LDP/MLG, and cash prices plus LDP/MLG minus carrying charges.

Soybean prices for the 1998 crop followed a pattern similar to that for corn. Pre-harvest forward contract prices were generally above \$6.00 per bushel until May 1998. Prices declined into harvest, managed a modest post-harvest recovery, and then declined sharply into the last part of the marketing window. The post-harvest rally was associated with a brief period of concern about the South American crop and a typical post-harvest strengthening of the basis. The South American crop turned out to be large and US producers planted record soybean acreage in the spring of 1999. The 1999 harvest was the third consecutive large harvest in the US. Like corn prices, the pattern of soybean prices was classic for a large crop year followed by another large crop. LDPs were positive at harvest time. Cash prices moved above the loan rate for a brief period following harvest and then LDP/MLGs became large in the spring and summer of 1999.

The 1998/1999 price pattern for soybeans favored those who made sales prior to planting and penalized those who stored the crop unpriced late into the marketing year. The penalty was especially large for those who established the LDP at harvest and stored the crop unpriced into the spring or summer of 1999.

Average Pricing Performance Results for the Advisory Programs

A summary of the results of the pricing performance evaluations for the 1995, 1996, 1997 and 1998 corn and soybean marketing periods is contained in Tables 6 through 8 and Figures 7 through 9. The results for the 1995, 1996 and 1997 marketing periods are those contained in the

1997 AgMAS Corn and Soybean Pricing Report.²⁴ Tables 6 through 8 present pricing results for each year along with two-year averages (1997-1998), three-year averages (1996-1998) and four-year averages (1995-1998).²⁵ Some marketing programs are not included in all of the averages. For example, four-year averages are calculated only for the 19 marketing programs that were evaluated for all four years. The following discussion focuses on the four-year average results, as this is the longest time period.

As shown in Table 6, the average net advisory corn price over the four years for the 19 programs is \$2.52 per bushel, one cent below the four-year market benchmark price of \$2.53 per bushels. The results range from a low of \$2.36 to a high of \$2.82 per bushel.

The four-year results for soybeans are listed in Table 7. The average net advisory soybean price over the four years is \$6.50 per bushel, 12 cents above the four-year market benchmark price of \$6.38 per bushel. The results range from a low of \$6.31 to a high of \$6.88 per bushel.

The four-year results for advisory revenue are presented in Table 8. The average advisory revenue for the four years is \$325 per acre. This is \$2 per acre higher than the four-year market benchmark revenue. The results range from a low of \$311 to a high of \$349 per acre.

As shown in the top chart in Figure 9, 10 of the 19 corn marketing programs achieve a four-year average net advisory price that is above the four-year average market benchmark price of \$2.53 per bushel. The middle chart in Figure 9 shows that 13 of the 19 soybean programs achieve a four-year average price that is above the four-year average market benchmark price of \$6.38 per bushel.

The bottom chart in Figure 9 shows the comparison of the four-year average advisory revenue versus the four-year average revenue implied by the market benchmark price. Ten of the 19 advisory programs achieve a four-year average revenue that is above average market benchmark revenue of \$323 per acre.

A First Look at Pricing Performance and Risk of the Advisory Programs

An advisory program's net price received is an important indicator of performance. However, pricing performance almost certainly is not the only relevant indicator. For example, two advisory programs may generate the same average net price across marketing periods, but the risk of the programs may differ substantially. The difference in risk may be the result of: i) type of recommended pricing tool (cash, forward, futures, options, etc.), ii) timing of sales, and iii) implementation of marketing strategies.

²⁴ Jackson, T.E., S.H. Irwin and D.L. Good. "1997 Pricing Performance of Market Advisory Services for Corn and Soybeans," AgMAS Project Research Report 1999-01, February 1999. This report is available on the AgMAS website (<http://www.aces.uiuc.edu/~agmas/>).

²⁵ In this section and the next, terms like "two-year average" are used to refer to averages of net advisory prices over multiple marketing periods.

In order to quantify the risk of advisory programs, a definition of risk must be developed. Risk is usually thought of as the possibility or probability of loss. A natural extension of this idea looks at risk as the chance producers will fail to achieve the net price they expect based on following an advisory program. This approach to quantifying risk does not measure the possibility of loss alone. Risk is seen as uncertainty – the likelihood that what is expected will fail to happen, whether the outcome is better or worse than expected. So an unexpected return on the upside or the downside – a net price of \$2.50 or \$1.50 per bushel when a net price of \$2.00 per bushel is expected – counts in determining the “risk” of an advisory program. Thus, an advisory program whose net price does not depart much from its expected, or average, net price is said to carry little risk. In contrast, an advisory program whose net price is quite volatile from year-to-year, often departing from expected net price, is said to be quite risky.

This approach to defining risk can be quantified by using a statistical measure called the standard deviation.²⁶ It measures the dispersion of year-to-year net advisory prices from the average net price. One can think of the standard deviation as the “typical” variation in net price from year-to-year. The larger the standard deviation of an advisory program, the less likely a producer is to get exactly the net price expected, though it is possible by chance to get a higher price instead of a lower one for any particular time period.

Separate analysis of market advisory pricing performance and risk will provide valuable information to producers. However, as economic theories of decision-making under risk highlight, it is the tradeoff between pricing performance and risk that is likely to be of greatest interest to producers.²⁷ Theory suggests that above-average pricing performance should be possible only if marketing strategies are recommended that have above-average risk (and *vice versa*). Faced with such a choice set, producers will choose an advisory program that has a pricing-risk tradeoff that is consistent with their risk preferences.²⁸

The basic data needed for assessing the pricing-risk tradeoff of market advisory programs is presented in Table 9. For each advisory program tracked in all four years of AgMAS evaluations, the four-year average net advisory price or revenue and standard deviation of net advisory price or revenue is reported. The standard deviations indicate that the risk of advisory programs varies substantially. In corn, the standard deviations range from a low of \$0.15 per bushel to a high of \$0.85 per bushel. The average standard deviation across the 19 corn

²⁶ For a given advisory program, the formula for standard deviation is,

$$\hat{\sigma} = \sqrt{\frac{1}{T-1} \sum_{t=1}^T (y_t - \bar{y})^2}$$

where T is the number of years in the sample, y_t is the advisory program’s net price for the t^{th} year and \bar{y} is the average net advisory price over the T years.

²⁷ Ingersoll, J. *Theory of Financial Decision Making*. Roman and Littlefield: Savage, Maryland, 1987.

²⁸ A good non-technical introduction to measuring risk and performance in a return-risk framework can be found in: B.G. Malkiel. *A Random Walk Down Wall Street*. W.W. Norton & Company: New York, New York, 1999.

programs is \$0.42 per bushel, which is higher than the \$0.30 per bushel standard deviation of the corn market benchmark. In soybeans, the standard deviations range from a low of \$0.33 per bushel to a high of \$0.94 per bushel. The average standard deviation across the 19 soybean programs is \$0.67 per bushel, which also is higher than the \$0.52 per bushel standard deviation of the soybean market benchmark. Finally, revenue standard deviations for the 19 programs range from a low of \$22 per acre to a high of \$52 per acre. The average revenue standard deviation across the 19 programs is \$36 per bushel, higher than the \$30 per acre standard deviation of the market benchmark.

The estimated relationship between pricing performance and risk for corn is presented in Figure 10. As economic theory predicts, there is a positive tradeoff between the average price and standard deviation; securing a higher net corn price generally requires that an advisory program take on more risk, and *vice versa*. The strength of the relationship is measured by the correlation coefficient, which can take on values between -1 and $+1$. A negative value means that net price and standard deviation tend to move in opposite directions, while a positive value means they tend to move in the same direction. The closer a correlation coefficient is to -1 or $+1$, the stronger the tendency. Since the estimated correlation coefficient for corn is $+0.65$, a modestly strong relationship is indicated.

The performance implications of the tradeoff between corn pricing performance and risk is explored in Figure 11. The chart is the same as in Figure 10, except it is now divided into four quadrants based on the average price and standard deviation of the market benchmark. Advisory programs in the upper left quadrant have a higher price and less risk than the benchmark, which is the most desirable outcome from a producer's perspective. Advisory programs in the lower right quadrant have a lower price and more risk than the benchmark, which is the least desirable outcome from a producer's perspective. The two remaining quadrants reflect a higher price and more risk than the market benchmark or a lower price and less risk than the market benchmark. A producer may prefer an advisory program to the market benchmark in either of these two quadrants, but this depends on personal preference for risk relative to return.

The data plotted in Figure 11 show there is only one advisory program in corn that generates a combination of net price and risk superior to the market benchmark (upper left quadrant). In contrast, six advisory programs in corn produce a combination that is inferior to the benchmark (lower right quadrant). Only three programs have a lower price and less risk than the benchmark, while nine programs have a higher price and more risk.

The estimated relationship between pricing performance and risk for soybeans is presented in Figure 12. Again, as economic theory predicts, there is a positive tradeoff between the average price and standard deviation; achieving a higher soybean net price generally requires that an advisory program take on more risk, and *vice versa*. The estimated correlation coefficient for soybeans is $+0.27$, indicating a weaker relationship than was found for corn.

The data plotted in Figure 13 show there are only two advisory programs in soybeans that generate a combination of net price and risk superior to the market benchmark (upper left quadrant). Five advisory programs in soybeans produce a combination that is inferior to the

benchmark (lower right quadrant). Only one program has a lower price and less risk than the benchmark, while eleven programs have a higher price and more risk.

The estimated relationship between performance and risk for corn and soybean 50/50 revenue is presented in Figure 14. Given the results for corn and soybeans, it is not surprising that there is a positive tradeoff between average revenue and standard deviation; producing higher revenue generally requires that an advisory program take on more risk, and *vice versa*. The estimated correlation coefficient for revenue is +0.63, indicating a substantial relationship between average revenue and risk.

Based on 50/50 revenue, the data plotted in Figure 15 show that no advisory program generates a combination of average revenue and risk superior to the market benchmark (upper left quadrant). Seven advisory programs produce a revenue combination that is inferior to the benchmark (lower right quadrant). Only two programs have lower revenue and less risk than the benchmark, while ten programs have higher revenue and more risk.

Previous research on financial investments suggests that return-risk results, like those presented above, may be sensitive to alternative specifications of the market benchmark. To investigate this issue, the pricing (or revenue) performance and risk of market advisory programs is compared to a 20-month average cash price benchmark in Figures 16 through 18. Compared to the 24-month benchmark, the 20-month benchmark simply deletes the first four months of each marketing window from the computations of the benchmark price. The change barely impacts the average benchmark price or revenue for the four years of analysis. This is not surprising given the nature of the average cash price benchmarks. In informationally efficient markets, annual averages of different average cash price benchmarks should be roughly similar when stated on a harvest equivalent basis. The same logic does not necessarily carry over to the standard deviations of the alternative benchmarks. In this case, standard deviations for the 20-month benchmark are substantially higher than those of the 24-month benchmark. The higher standard deviations for the 20-month benchmark do make sense, given that the 20-month benchmark includes less pre-harvest forward contracting than the 24-month benchmark. It is interesting to note that the risk of the 20-month benchmark approximately matches the average risk of net advisory prices in corn, soybeans and 50/50 revenue.

The comparisons in Figures 16 through 18 indicate that the risk-return performance of market advisory programs is somewhat sensitive to the change in market benchmarks. This is most notable for the upper left performance quadrant, where advisory programs have higher prices and less risk than the market benchmark. Five advisory programs generate average corn prices and risk in the upper left quadrant based on the 20-month benchmark, compared to only one with the 24-month benchmark. Six advisory programs generate average soybeans prices and risk in the upper left quadrant based on the 20-month benchmark, compared to only one with the 24-month benchmark. Four advisory programs generate average 50/50 revenue and risk in the upper left quadrant based on the 20-month benchmark, compared to none with the 24-month benchmark.

While there is some sensitivity of the return-risk results to alternative benchmarks, it is important to emphasize that the basic findings are unchanged. Whether a 24-month or 20-month benchmark is considered, about two-thirds of the advisory programs generate average prices and risk in the higher price/more risk or lower price/less risk quadrants. Hence, producing a higher average price or revenue generally requires that an advisory program take on more risk, and *vice versa*.

Overall, the results presented in this section suggest performance analysis is markedly affected by the inclusion of risk. As an example, consider the case of soybeans using a 24-month benchmark. If only one dimension of performance is considered, the average net advisory price over the four-year period, 13 of the 19 soybean programs “beat” the 24-month market benchmark. However, when two dimensions of performance are considered, average price and standard deviation, only two programs “beat” the 24-month market benchmark in soybeans. The other 11 programs did not beat the market in a return-risk framework because they took on more risk to generate higher average prices.

It is important to emphasize at this point that the pricing and risk performance results are based on only four observations. This is a small sample for estimating the true risks of market advisory programs. Hence, the results presented in this section should be viewed as exploratory rather than definitive.

Finally, the approach to performance evaluation presented in this section opens the door to a new type of analysis. Modern Portfolio Theory (MPT) shows how to combine market advisory programs into “portfolios” that have the highest return for a given level of risk. A “portfolio” might consist of 50 percent of corn and soybeans marketed by advisory program *X* and 50 percent marketed by advisory program *Y*. MPT produces “efficient portfolios” by taking advantage of the diversification opportunities available through combining advisory programs. In fact, it is possible that some portfolios of advisory programs will generate higher prices and less risk than the market benchmark (lie in the upper left quadrant of Figures 11, 13 or 15), even though the individual advisory programs that make up the portfolio do not. The potential improvement in performance depends on the degree to which net advisory prices do *not* tend to move together. The application of MPT to market advisory services represents an interesting area of future research for the AgMAS Project.

Table 1. Linear Model of 1998 Corn Harvest Progress in Central Illinois and Associated Loan Deficiency Payment

Date	Harvest Progress Through Date	LDP on Date	Average LDP Through Date
	---percent---	---\$/bushel---	---\$/bushel---
09/23/98	4	0.32	0.32
09/24/98	8	0.32	0.32
09/25/98	12	0.29	0.31
09/28/98	16	0.27	0.30
09/29/98	20	0.25	0.29
09/30/98	24	0.26	0.28
10/01/98	28	0.27	0.28
10/02/98	32	0.31	0.29
10/05/98	36	0.28	0.29
10/06/98	40	0.24	0.28
10/07/98	44	0.23	0.28
10/08/98	48	0.17	0.27
10/09/98	52	0.17	0.26
10/13/98	56	0.12	0.25
10/14/98	60	0.05	0.24
10/15/98	64	0.05	0.23
10/16/98	68	0.04	0.21
10/19/98	72	0.05	0.21
10/20/98	76	0.08	0.20
10/21/98	80	0.10	0.19
10/22/98	84	0.11	0.19
10/23/98	88	0.09	0.19
10/26/98	92	0.11	0.18
10/27/98	96	0.12	0.18
10/28/98	100	0.11	0.18

Table 2. Linear Model of 1998 Soybean Harvest Progress in Central Illinois and Associated Loan Deficiency Payment

Date	Harvest Progress Through Date	LDP on Date	Average LDP Through Date
	---percent---	---\$/bushel---	---\$/bushel---
09/17/98	4	0.40	0.40
09/18/98	8	0.43	0.42
09/21/98	12	0.51	0.45
09/22/98	16	0.52	0.47
09/23/98	20	0.46	0.46
09/24/98	24	0.49	0.47
09/25/98	28	0.42	0.46
09/28/98	32	0.44	0.46
09/29/98	36	0.40	0.45
09/30/98	40	0.47	0.45
10/01/98	44	0.54	0.46
10/02/98	48	0.62	0.48
10/05/98	52	0.61	0.49
10/06/98	56	0.56	0.49
10/07/98	60	0.54	0.49
10/08/98	64	0.42	0.49
10/09/98	68	0.34	0.48
10/13/98	72	0.11	0.46
10/14/98	76	0.11	0.44
10/15/98	80	0.19	0.43
10/16/98	84	0.17	0.42
10/19/98	88	0.15	0.40
10/20/98	92	0.22	0.40
10/21/98	96	0.22	0.39
10/22/98	100	0.22	0.38

Table 3. Pricing Performance Results for 23 Market Advisory Programs, Corn, 1998 Marketing Period

Market Advisory Program	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Unadjusted Cash Sales Price	Interest Costs	Carrying Charges Storage Costs	Shrink Costs	Net Cash Sales Price	Futures & Options Gain	Brokerage Costs	LDP / MLG	Net Advisory Price
	---\$/bushel---								
Ag Line by Doane (cash-only)	2.20	0.03	0.10	0.03	2.05	0.00	0.00	0.17	2.22
Ag Line by Doane (hedge)	2.20	0.03	0.10	0.03	2.05	0.11	0.01	0.17	2.32
Ag Profit by Hjort Associates	2.13	0.06	0.18	0.04	1.86	-0.07	0.01	0.26	2.05
Ag Resource	1.95	0.05	0.16	0.03	1.70	0.34	0.09	0.27	2.21
Ag Review	2.09	0.06	0.17	0.04	1.82	0.23	0.01	0.20	2.25
Agri-Mark	2.05	0.03	0.14	0.04	1.83	0.05	0.02	0.10	1.97
Agri-Visor Aggressive Cash	2.11	0.02	0.06	0.01	2.01	-0.02	0.00*	0.26	2.25
Agri-Visor Aggressive Hedge	2.11	0.02	0.06	0.01	2.01	-0.19	0.03	0.26	2.05
Agri-Visor Basic Cash	2.10	0.03	0.09	0.02	1.95	-0.01	0.00*	0.22	2.16
Agri-Visor Basic Hedge	2.14	0.03	0.09	0.02	1.99	-0.16	0.02	0.22	2.03
Allendale (futures & options)	2.08	0.04	0.15	0.04	1.84	0.17	0.01	0.08	2.09
Allendale (futures only)	2.08	0.04	0.15	0.04	1.84	0.40	0.02	0.14	2.36
Brock (cash-only)	2.23	0.06	0.15	0.03	1.98	0.00	0.00	0.12	2.10
Brock (hedge)	2.24	0.06	0.15	0.03	2.00	0.33	0.05	0.12	2.40
Freese-Notis	2.26	0.04	0.11	0.02	2.08	0.00	0.00	0.15	2.23
Pro Farmer (cash-only)	2.17	0.06	0.15	0.03	1.93	0.00	0.00	0.16	2.09
Pro Farmer (hedge)	2.17	0.06	0.11	0.03	1.97	0.08	0.02	0.16	2.19
Progressive Ag.	2.13	0.02	0.12	0.04	1.95	-0.13	0.01	0.12	1.93
Stewart-Peterson Advisory Reports	2.18	0.05	0.13	0.03	1.97	-0.08	0.04	0.17	2.02
Stewart-Peterson Strictly Cash	2.27	0.03	0.09	0.02	2.13	0.00	0.00	0.15	2.28
Top Farmer Intelligence	2.21	0.04	0.10	0.02	2.06	-0.09	0.05	0.20	2.12
Utterback Marketing Services	2.26	0.00	0.00	0.00	2.26	0.13	0.05	0.18	2.51
Zwicker Cycle Letter	2.09	0.02	0.06	0.01	1.99	-0.19	0.03	0.26	2.03
Descriptive Statistics:									
Average	2.15	0.04	0.12	0.03	1.97	0.04	0.02	0.18	2.17
Median	2.14	0.04	0.11	0.03	1.98	0.00	0.02	0.17	2.16
Minimum	1.95	0.00	0.00	0.00	1.70	-0.19	0.00	0.08	1.93
Maximum	2.27	0.06	0.18	0.04	2.26	0.40	0.09	0.27	2.51
Range	0.32	0.06	0.18	0.04	0.56	0.59	0.09	0.18	0.58
Standard Deviation	0.08	0.02	0.04	0.01	0.12	0.17	0.02	0.06	0.15
Market Benchmark Price	2.21	0.03	0.09	0.02	2.08	0.00	0.00	0.16	2.24

Notes: Net cash sales price is calculated as (1) - (2) - (3) - (4). Net advisory price is calculated as (5) + (6) - (7) + (8), and therefore, is stated on a harvest equivalent basis. The market benchmark price also is stated on a harvest equivalent basis. LDP stands for loan deficiency payment and MLG stands for marketing loan gain. A star means that there is a positive actual brokerage charge, however it is rounded down to zero. The 1998 marketing period is a two-year window from September 1997 through August 1999.

Table 4. Pricing Performance Results for 22 Market Advisory Programs, Soybeans, 1998 Marketing Period

Market Advisory Program	(1) Unadjusted Cash Sales Price	(2) Carrying Charges Interest Costs	(3) Storage Costs	(4) Net Cash Sales Price	(5) Futures & Options Gain	(6) Brokerage Costs	(7) LDP / MLG	(8) Net Advisory Price
				---\$/bushel---				
Ag Line by Doane (cash-only)	5.46	0.08	0.11	5.27	0.00	0.00	0.38	5.65
Ag Line by Doane (hedge)	5.27	0.10	0.15	5.02	0.22	0.01	0.37	5.60
Ag Profit by Hjort Associates	5.27	0.16	0.15	4.96	-0.10	0.01	0.41	5.26
Ag Resource	5.04	0.10	0.15	4.79	0.98	0.03	0.43	6.17
Ag Review	5.22	0.16	0.14	4.91	-0.07	0.01	0.27	5.11
Agri-Mark	5.70	0.04	0.06	5.60	-0.22	0.01	0.34	5.71
Agri-Visor Aggressive Cash	5.13	0.14	0.12	4.87	0.00	0.00	0.68	5.55
Agri-Visor Aggressive Hedge	5.36	0.07	0.06	5.23	-0.11	0.03	0.68	5.77
Agri-Visor Basic Cash	5.13	0.14	0.12	4.87	0.00	0.00	0.68	5.55
Agri-Visor Basic Hedge	5.36	0.07	0.06	5.23	-0.10	0.02	0.68	5.79
Allendale (futures only)	5.41	0.09	0.20	5.11	0.51	0.01	0.29	5.90
Brock (cash-only)	5.30	0.14	0.14	5.01	0.00	0.00	0.64	5.65
Brock (hedge)	5.82	0.11	0.12	5.59	0.37	0.01	0.64	6.58
Freese-Notis	5.55	0.07	0.09	5.39	0.00	0.00	0.42	5.81
Pro Farmer (cash-only)	5.42	0.11	0.13	5.18	0.00	0.00	0.56	5.74
Pro Farmer (hedge)	5.53	0.06	0.10	5.37	0.13	0.01	0.37	5.85
Progressive Ag.	5.72	0.05	0.09	5.58	-0.24	0.01	0.38	5.71
Stewart-Peterson Advisory Reports	5.61	0.07	0.08	5.46	0.54	0.01	0.38	6.36
Stewart-Peterson Strictly Cash	5.59	0.07	0.09	5.43	0.00	0.00	0.53	5.96
Top Farmer Intelligence	5.55	0.09	0.07	5.40	0.49	0.04	0.48	6.32
Utterback Marketing Services	5.50	0.00	0.00	5.50	0.28	0.03	0.38	6.13
Zwicker Cycle Letter	5.35	0.07	0.06	5.22	-0.11	0.02	0.68	5.76
<i>Descriptive Statistics:</i>								
<i>Average</i>	5.42	0.09	0.10	5.23	0.12	0.01	0.49	5.82
<i>Median</i>	5.42	0.08	0.10	5.23	0.00	0.01	0.42	5.77
<i>Minimum</i>	5.04	0.00	0.00	4.79	-0.24	0.00	0.27	5.11
<i>Maximum</i>	5.82	0.16	0.20	5.60	0.98	0.04	0.68	6.58
<i>Range</i>	0.77	0.16	0.20	0.82	1.22	0.04	0.41	1.47
<i>Standard Deviation</i>	0.20	0.04	0.04	0.26	0.30	0.01	0.14	0.34
<i>Market Benchmark Price</i>	5.45	0.08	0.09	5.29	0.00	0.00	0.57	5.86

Notes: Net cash sales price is calculated as (1) - (2) - (3). Net advisory price is calculated as (4) + (5) - (6) + (7), and therefore, is stated on a harvest equivalent basis. The market benchmark price also is stated on a harvest equivalent basis. LDP stands for loan deficiency payment and MLG stands for marketing loan gain. The 1998 marketing period is a two-year window from September 1997 through August 1999.

Table 5. Revenue Performance Results for 22 Market Advisory Programs, Corn and Soybeans, 50/50 Advisory Revenue, 1998 Marketing Period

Market Advisory Program	(1)	(2)	(3)	(4)
	Advisory Revenue		50/50 Advisory Revenue	Annual Cost of Service
	Corn	Soybeans		
	---\$/acre---		---\$/acre---	---\$/year---
Ag Line by Doane (cash-only)	331	277	304	300
Ag Line by Doane (hedge)	346	274	310	300
Ag Profit by Hjort Associates	305	258	282	280
Ag Resource	329	302	316	600
Ag Review	335	250	293	450
Agri-Mark	294	280	287	300
Agri-Visor Aggressive Cash	335	272	304	299
Agri-Visor Aggressive Hedge	305	283	294	299
Agri-Visor Basic Cash	322	272	297	299
Agri-Visor Basic Hedge	302	284	293	299
Allendale (futures only)	352	289	320	240
Brock (cash-only)	313	277	295	240
Brock (hedge)	358	322	340	240
Freese-Notis	332	285	308	360
Pro Farmer (cash-only)	311	281	296	324
Pro Farmer (hedge)	326	287	306	324
Progressive Ag.	288	280	284	240
Stewart-Peterson Advisory Reports	301	312	306	180
Stewart-Peterson Strictly Cash	340	292	316	99
Top Farmer Intelligence	316	310	313	240
Utterback Marketing Services	374	300	337	300
Zwicker Cycle Letter	302	282	292	269
<i>Descriptive Statistics:</i>				
<i>Average</i>	324	285	304	295
<i>Median</i>	324	282	304	299
<i>Minimum</i>	288	250	282	99
<i>Maximum</i>	374	322	340	600
<i>Range</i>	86	72	58	501
<i>Standard Deviation</i>	22	17	15	95
Market Benchmark Revenue	334	287	310	

Notes: Advisory revenue per acre for corn (soybeans) is calculated as net advisory price times 149 (49) bushels. Market benchmark revenue per acre for corn (soybeans) is calculated as market benchmark price times 149 (49) bushels. 50/50 advisory revenue is calculated as (1) x 0.5 + (2) x 0.5. Advisory revenue per acre and market benchmark revenue are stated on a harvest equivalent basis. The annual cost of a service is not subtracted from advisory revenue per acre. The 1998 marketing period is a two-year window from September 1997 through August 1999.

Table 6. Pricing Performance Results for Market Advisory Programs, Corn, Two-Year, Three-Year, and Four-Year Averages

Market Advisory Program	1995 Net Advisory Price	1996 Net Advisory Price	1997 Net Advisory Price	1998 Net Advisory Price	1997-98 Two-Year Average	1996-98 Three-Year Average	1995-98 Four-Year Average
---\$/bushel---							
Ag Alert for Ontario	N/A	2.47	N/A	N/A	N/A	N/A	N/A
Ag Line by Doane (cash-only)	3.15	2.65	2.33	2.22	2.28	2.40	2.59
Ag Line by Doane (hedge)	N/A	2.61	2.29	2.32	2.31	2.41	N/A
Ag Profit by Hjort Associates	3.08	2.49	2.00	2.05	2.03	2.18	2.41
Ag Resource	3.90	3.12	2.07	2.21	2.14	2.47	2.82
Ag Review	2.59	2.76	2.57	2.25	2.41	2.53	2.54
Agri-Edge (cash-only)	3.07	2.62	N/A	N/A	N/A	N/A	N/A
Agri-Edge (hedge)	3.15	3.10	N/A	N/A	N/A	N/A	N/A
Agri-Mark	3.63	2.73	2.13	1.97	2.05	2.28	2.61
Agri-Visor Aggressive Cash	3.30	2.83	2.43	2.25	2.34	2.50	2.70
Agri-Visor Aggressive Hedge	3.10	2.58	2.41	2.05	2.23	2.35	2.54
Agri-Visor Basic Cash	2.72	2.65	2.34	2.16	2.25	2.38	2.47
Agri-Visor Basic Hedge	2.90	2.63	2.33	2.03	2.18	2.33	2.47
Allendale (futures & options)	N/A	2.75	2.38	2.09	2.24	2.41	N/A
Allendale (futures only)	2.46	2.08	2.55	2.36	2.46	2.33	2.36
Brock (cash-only)	2.75	2.70	2.34	2.10	2.22	2.38	2.47
Brock (hedge)	2.29	2.39	2.64	2.40	2.52	2.48	2.43
Freese-Notis	2.95	2.87	2.22	2.23	2.23	2.44	2.57
Grain Field Report	3.19	N/A	N/A	N/A	N/A	N/A	N/A
Harris Weather/Elliott Advisory	3.16	2.28	N/A	N/A	N/A	N/A	N/A
North American Ag.	3.22	N/A	N/A	N/A	N/A	N/A	N/A
Pro Farmer (cash-only)	3.16	2.64	2.19	2.09	2.14	2.31	2.52
Pro Farmer (hedge)	3.06	2.67	2.28	2.19	2.24	2.38	2.55
Progressive Ag.	N/A	2.53	2.26	1.93	2.10	2.24	N/A
Prosperous Farmer	2.91	N/A	N/A	N/A	N/A	N/A	N/A
Stewart-Peterson Advisory Reports	2.90	2.46	2.09	2.02	2.06	2.19	2.37
Stewart-Peterson Strictly Cash	2.92	2.68	2.32	2.28	2.30	2.43	2.55
Top Farmer Intelligence	3.17	2.44	2.15	2.12	2.14	2.24	2.47
Utterback Marketing Services	N/A	N/A	2.74	2.51	2.63	N/A	N/A
Zwicker Cycle Letter	3.15	2.56	2.40	2.03	2.22	2.33	2.54
Descriptive Statistics:							
<i>Average</i>	3.03	2.63	2.32	2.17	2.25	2.36	2.52
<i>Median</i>	3.08	2.64	2.33	2.16	2.23	2.38	2.54
<i>Minimum</i>	2.29	2.08	2.00	1.93	2.03	2.18	2.36
<i>Maximum</i>	3.90	3.12	2.74	2.51	2.63	2.53	2.82
<i>Range</i>	1.61	1.04	0.74	0.58	0.60	0.35	0.46
<i>Standard Deviation</i>	0.33	0.22	0.18	0.15	0.15	0.10	0.11
Market Benchmark Price	2.90	2.65	2.33	2.24	2.29	2.41	2.53

Notes: N/A denotes "not applicable" -- program did not exist or was not evaluated for that marketing year. Net advisory price and market benchmark price are stated on a harvest equivalent basis. The marketing period is a two-year window from September of previous year through August of next year.

Table 7. Pricing Performance Results for Market Advisory Programs, Soybeans, Two-Year, Three-Year, and Four-Year Averages

Market Advisory Program	1995 Net Advisory Price	1996 Net Advisory Price	1997 Net Advisory Price	1998 Net Advisory Price	1997-98 Two-year Average	1996-98 Three-year Average	1995-98 Four-year Average
	---\$/bushel---						
Ag Alert for Ontario	N/A	7.37	N/A	N/A	N/A	N/A	N/A
Ag Line by Doane (cash-only)	6.59	7.40	6.32	5.65	5.99	6.46	6.49
Ag Line by Doane (hedge)	N/A	N/A	N/A	5.60	N/A	N/A	N/A
Ag Profit by Hjort Associates	6.78	7.13	6.16	5.26	5.71	6.18	6.33
Ag Resource	6.92	7.29	6.47	6.17	6.32	6.64	6.71
Ag Review	6.59	7.37	6.19	5.11	5.65	6.22	6.31
Agri-Edge (cash-only)	6.70	7.28	N/A	N/A	N/A	N/A	N/A
Agri-Edge (hedge)	6.62	7.18	N/A	N/A	N/A	N/A	N/A
Agri-Mark	7.94	7.18	6.68	5.71	6.20	6.52	6.88
Agri-Visor Aggressive Cash	6.38	7.28	6.33	5.55	5.94	6.39	6.39
Agri-Visor Aggressive Hedge	6.97	7.40	6.14	5.77	5.96	6.44	6.57
Agri-Visor Basic Cash	6.42	7.06	6.35	5.55	5.95	6.32	6.34
Agri-Visor Basic Hedge	6.78	7.46	6.14	5.79	5.97	6.46	6.54
Allendale (futures only)	6.21	7.30	6.67	5.90	6.29	6.62	6.52
Brock (cash-only)	6.27	7.20	6.31	5.65	5.98	6.39	6.36
Brock (hedge)	5.71	6.99	6.93	6.58	6.76	6.83	6.55
Freese-Notis	6.41	7.13	6.15	5.81	5.98	6.36	6.37
Grain Field Report	6.84	N/A	N/A	N/A	N/A	N/A	N/A
Harris Weather/Elliott Advisory	6.85	6.80	N/A	N/A	N/A	N/A	N/A
North American Ag.	6.44	N/A	N/A	N/A	N/A	N/A	N/A
Pro Farmer (cash-only)	6.69	7.31	6.29	5.74	6.02	6.45	6.51
Pro Farmer (hedge)	6.78	7.49	6.47	5.85	6.16	6.60	6.65
Progressive Ag.	N/A	7.80	6.65	5.71	6.18	6.72	N/A
Prosperous Farmer	6.52	N/A	N/A	N/A	N/A	N/A	N/A
Stewart-Peterson Advisory Reports	6.09	7.37	6.22	6.36	6.29	6.65	6.51
Stewart-Peterson Strictly Cash	6.28	7.13	6.33	5.96	6.15	6.47	6.43
Top Farmer Intelligence	6.20	6.84	6.08	6.32	6.20	6.41	6.36
Utterback Marketing Services	N/A	N/A	6.99	6.13	6.56	6.56	N/A
Zwicker Cycle Letter	6.89	7.67	6.59	5.76	6.18	6.67	6.73
Descriptive Statistics:							
Average	6.59	7.27	6.40	5.82	6.11	6.49	6.50
Median	6.59	7.28	6.33	5.77	6.15	6.46	6.51
Minimum	5.71	6.80	6.08	5.11	5.65	6.18	6.31
Maximum	7.94	7.80	6.99	6.58	6.76	6.83	6.88
Range	2.23	1.00	0.91	1.47	1.11	0.65	0.56
Standard Deviation	0.41	0.23	0.26	0.34	0.25	0.16	0.15
Market Benchmark Price	6.26	7.11	6.30	5.86	6.08	6.42	6.38

Notes: N/A denotes "not applicable" -- program did not exist or was not evaluated for that marketing year. Net advisory price and market benchmark price are stated on a harvest equivalent basis. The marketing period is a two-year window from September of previous year through August of next year.

Table 8. Revenue Performance Results for Market Advisory Programs, Two-Year, Three-Year, and Four-Year Averages

Market Advisory Program	1995 50/50 Advisory Revenue	1996 50/50 Advisory Revenue	1997 50/50 Advisory Revenue	1998 50/50 Advisory Revenue	1997-98 Two-Year Average	1996-98 Three-Year Average	1995-98 Four-Year Average
				---\$/acre---			
Ag Alert for Ontario	N/A	359	N/A	N/A	N/A	N/A	N/A
Ag Line by Doane (cash-only)	326	374	310	304	307	329	328
Ag Line by Doane (hedge)	N/A	N/A	N/A	310	N/A	N/A	N/A
Ag Profit by Hjort Associates	326	355	283	282	282	307	311
Ag Resource	377	407	295	316	306	339	349
Ag Review	292	382	324	293	308	333	323
Agri-Edge (cash-only)	323	369	N/A	N/A	N/A	N/A	N/A
Agri-Edge (hedge)	327	403	N/A	N/A	N/A	N/A	N/A
Agri-Mark	382	375	304	287	296	322	337
Agri-Visor Aggressive Cash	330	385	317	304	310	335	334
Agri-Visor Aggressive Hedge	331	369	311	294	303	325	326
Agri-Visor Basic Cash	297	366	311	297	304	325	318
Agri-Visor Basic Hedge	315	374	306	293	299	324	322
Allendale (futures only)	277	327	334	320	327	327	314
Brock (cash-only)	295	373	311	295	303	326	318
Brock (hedge)	256	344	346	340	343	343	322
Freese-Notis	310	385	298	308	303	331	325
Grain Field Report	333	N/A	N/A	N/A	N/A	N/A	N/A
Harris Weather/Elliott Advisory	332	331	N/A	N/A	N/A	N/A	N/A
North American Ag.	327	N/A	N/A	N/A	N/A	N/A	N/A
Pro Farmer (cash-only)	329	371	300	296	298	322	324
Pro Farmer (hedge)	324	377	310	306	308	331	330
Progressive Ag.	N/A	374	313	284	298	323	N/A
Prosperous Farmer	310	N/A	N/A	N/A	N/A	N/A	N/A
Stewart-Peterson Advisory Reports	301	358	291	306	299	318	314
Stewart-Peterson Strictly Cash	306	370	310	316	313	332	325
Top Farmer Intelligence	319	345	292	313	302	316	317
Utterback Marketing Services	N/A	N/A	354	337	346	N/A	N/A
Zwicker Cycle Letter	332	373	321	292	307	329	330
Descriptive Statistics:							
<i>Average</i>	319	369	311	304	308	327	325
<i>Median</i>	324	372	310	304	304	327	324
<i>Minimum</i>	256	327	283	282	282	307	311
<i>Maximum</i>	382	407	354	340	346	343	349
<i>Range</i>	127	80	71	58	63	37	37
<i>Standard Deviation</i>	27	19	17	15	15	8	9
Market Benchmark Revenue	304	367	310	310	310	329	323

Notes: N/A denotes "not applicable" -- program did not exist or was not evaluated for that marketing year. 50/50 advisory revenue and market benchmark revenue are stated on a harvest equivalent basis. The marketing period is a two-year window from September of previous year through August of next year.

Table 9. Four-Year Averages and Standard Deviations for 19 Market Advisory Programs, Corn and Soybean Net Advisory Price and 50/50 Advisory Revenue, 1995-1998

Market Advisory Program	Corn		Soybeans		50/50 Advisory Revenue	
	Average Net Advisory Price	Standard Deviation of Net Advisory Price	Average Net Advisory Price	Standard Deviation of Net Advisory Price	Average Revenue	Standard Deviation of Revenue
	---\$/bushel---		---\$/bushel---		---\$/acre---	
Ag Line by Doane (cash-only)	2.59	0.42	6.49	0.72	328	32
Ag Profit by Hjort Associates	2.41	0.50	6.33	0.82	311	36
Ag Resource	2.82	0.85	6.71	0.49	349	52
Ag Review	2.54	0.21	6.31	0.94	323	42
Agri-Mark	2.61	0.75	6.88	0.94	337	49
Agri-Visor Aggressive Cash	2.70	0.47	6.39	0.71	334	36
Agri-Visor Aggressive Hedge	2.54	0.44	6.57	0.75	326	32
Agri-Visor Basic Cash	2.47	0.26	6.34	0.62	318	33
Agri-Visor Basic Hedge	2.47	0.37	6.54	0.74	322	36
Allendale (futures only)	2.36	0.21	6.52	0.61	314	26
Brock (cash-only)	2.47	0.31	6.36	0.64	318	37
Brock (hedge)	2.43	0.15	6.55	0.59	322	44
Freese-Notis	2.57	0.40	6.37	0.56	325	40
Pro Farmer (cash-only)	2.52	0.49	6.51	0.66	324	35
Pro Farmer (hedge)	2.55	0.40	6.65	0.68	330	33
Stewart-Peterson Advisory Reports	2.37	0.40	6.51	0.58	314	30
Stewart-Peterson Strictly Cash	2.55	0.31	6.43	0.50	325	30
Top Farmer Intelligence	2.47	0.49	6.36	0.33	317	22
Zwicker Cycle Letter	2.54	0.47	6.73	0.79	330	33
Descriptive Statistics:						
<i>Average</i>	2.52	0.42	6.50	0.67	325	36
<i>Median</i>	2.54	0.40	6.51	0.66	324	35
<i>Minimum</i>	2.36	0.15	6.31	0.33	311	22
<i>Maximum</i>	2.82	0.85	6.88	0.94	349	52
<i>Range</i>	0.46	0.70	0.56	0.61	37	30
Market Benchmark	2.53	0.30	6.38	0.52	323	30

Note: Results are shown only for the 19 advisory programs included in all four years of the AgMAS corn and soybean evaluations. The marketing period is a two-year window from September of previous year through August of next year.

Figure 1. Central Illinois Crop Reporting District



Figure 2. Loan Deficiency Payment (LDP) and Marketing Loan Gain (MLG) Rates for Corn and Soybeans, Central Illinois, 1998 Marketing Year

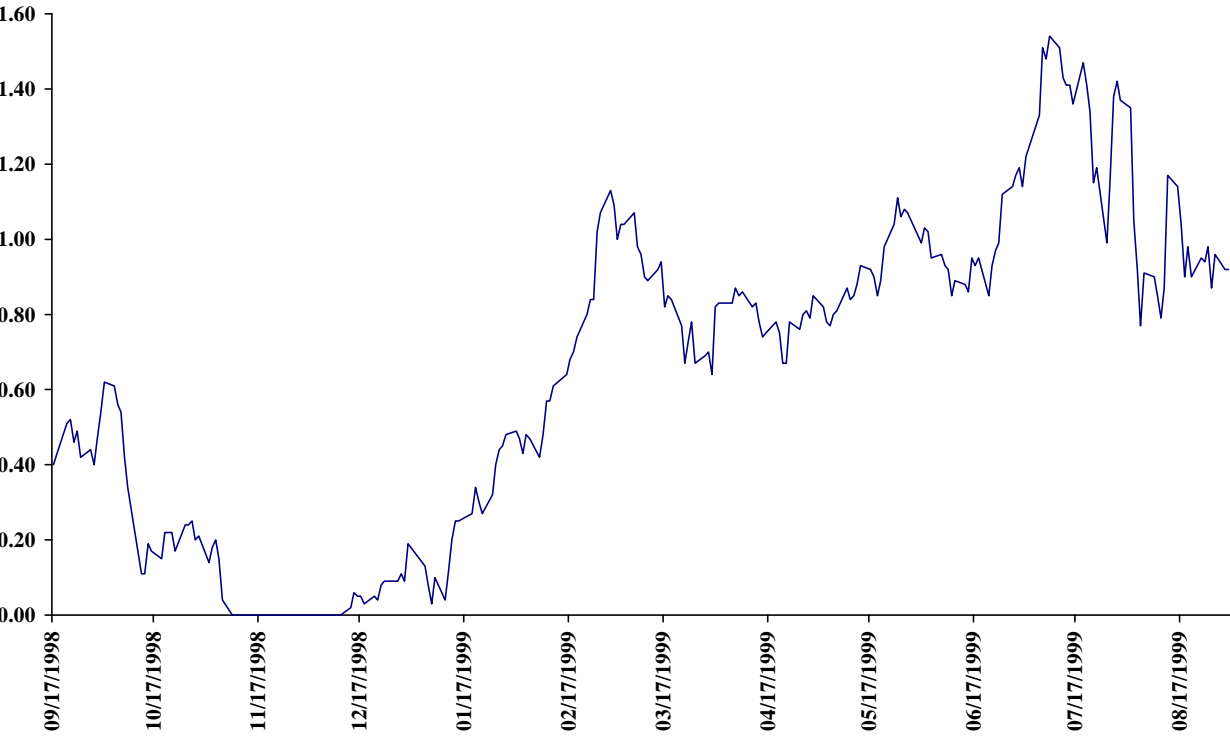
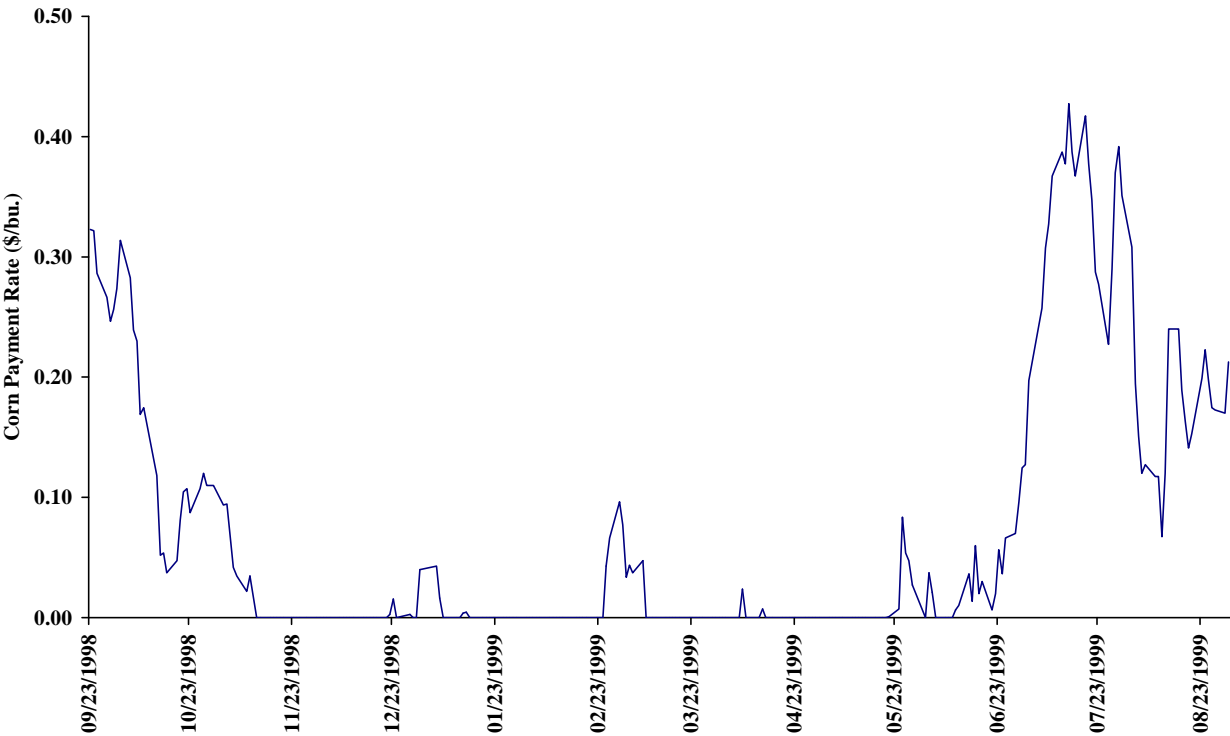


Figure 3. Distribution of Market Advisory Program Performance Relative to Market Benchmark, 1998 Marketing Period

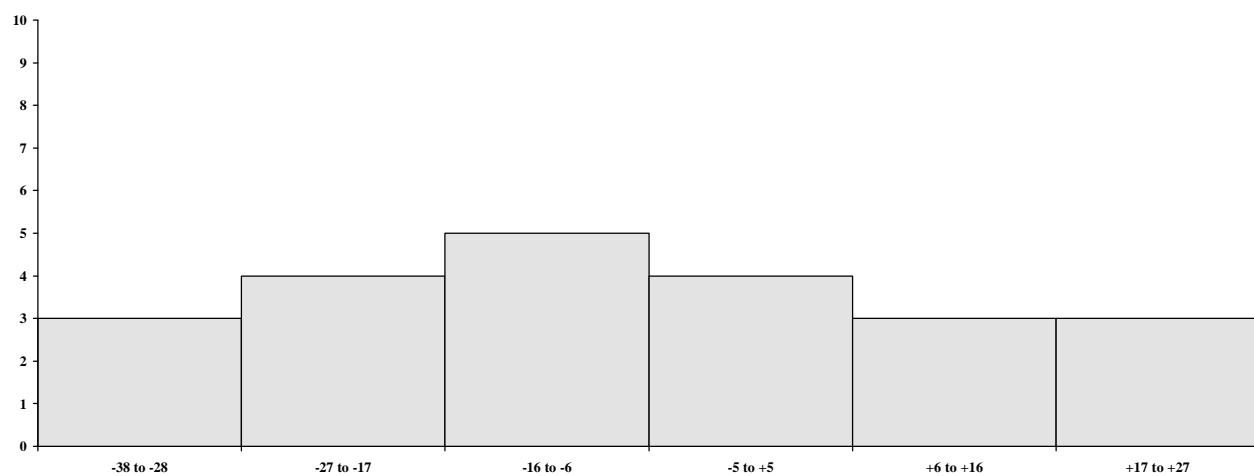
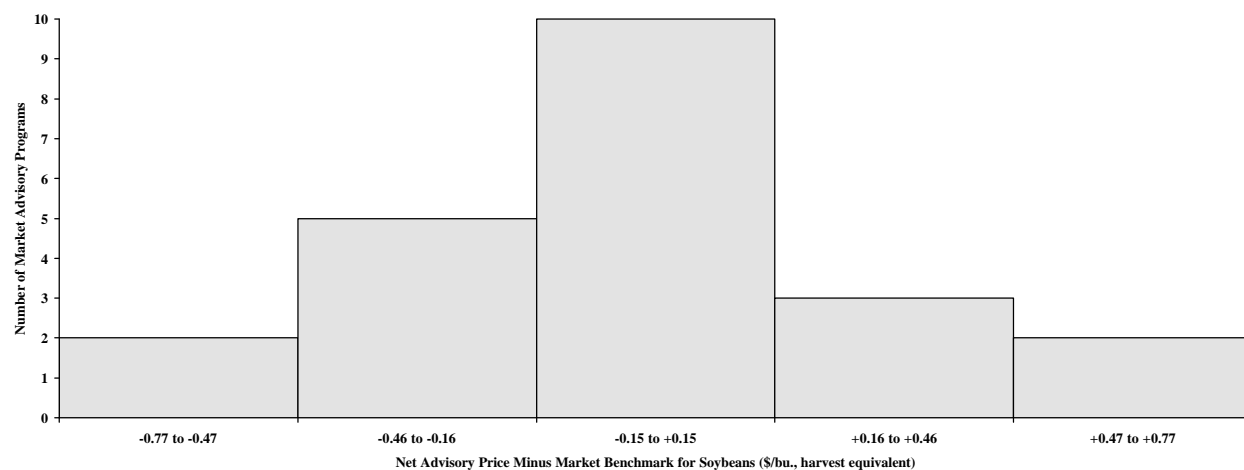
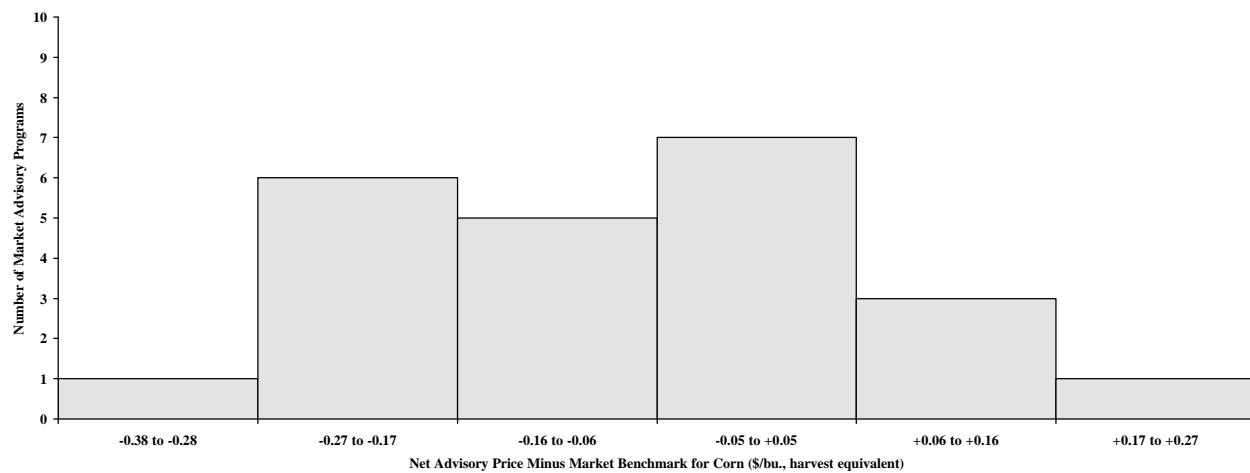


Figure 4. Comparison of Advisory Service Program Performance to Market Benchmark, 1998 Marketing Period

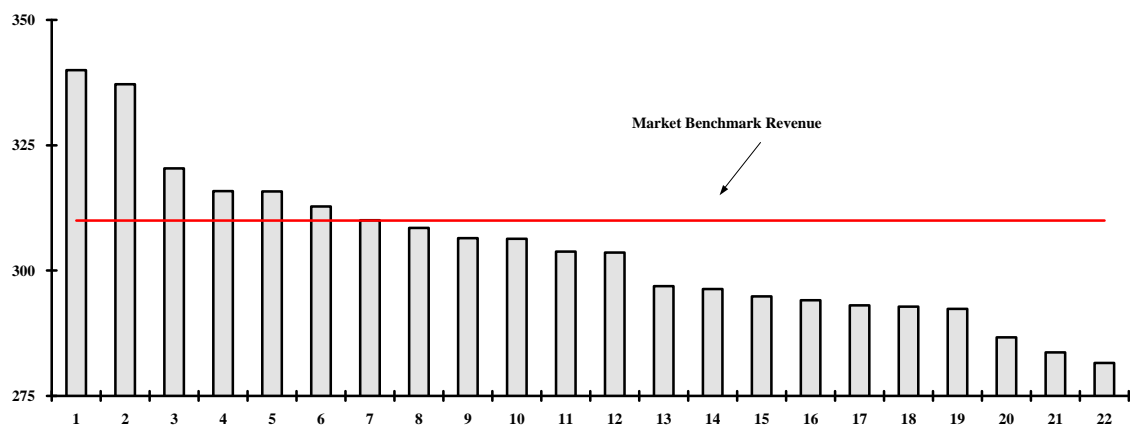
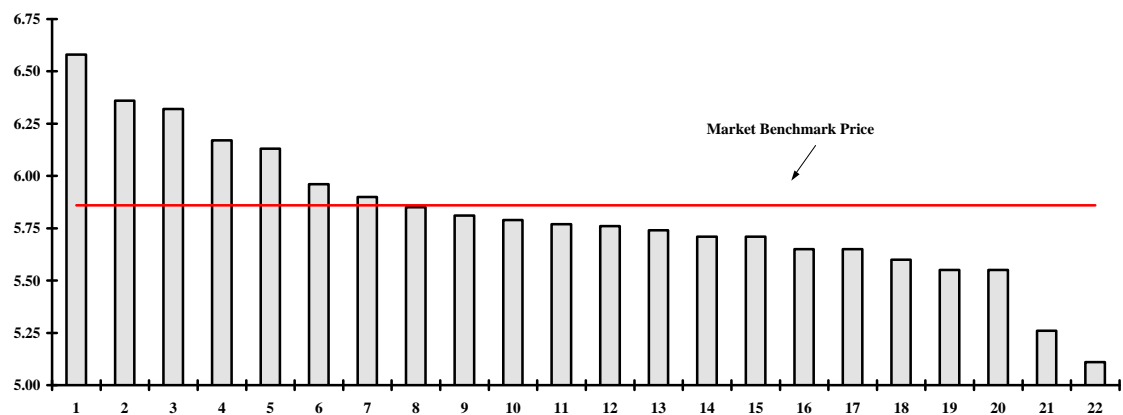
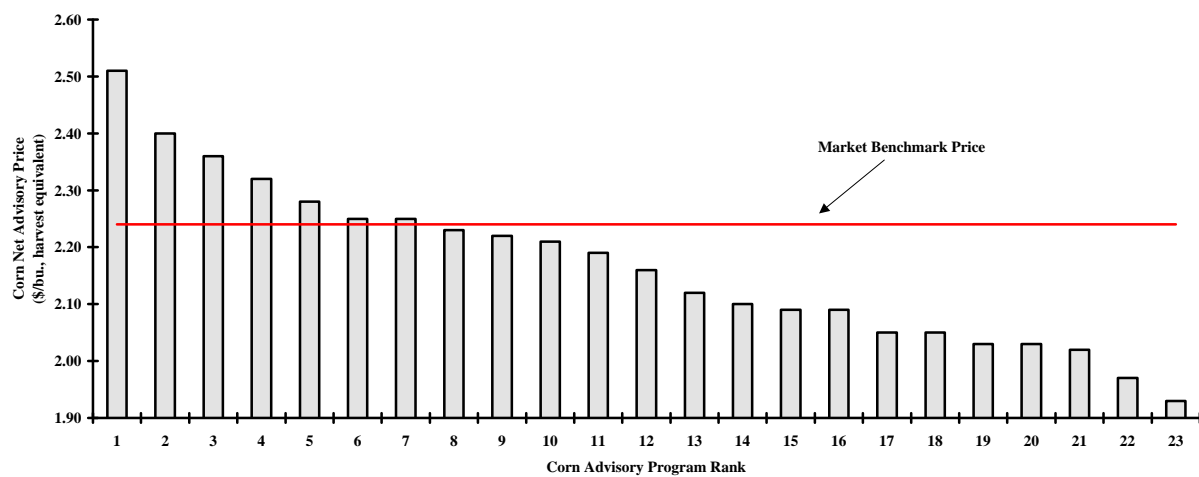


Figure 5. Daily Corn Prices, Central Illinois, 1998 Marketing Period

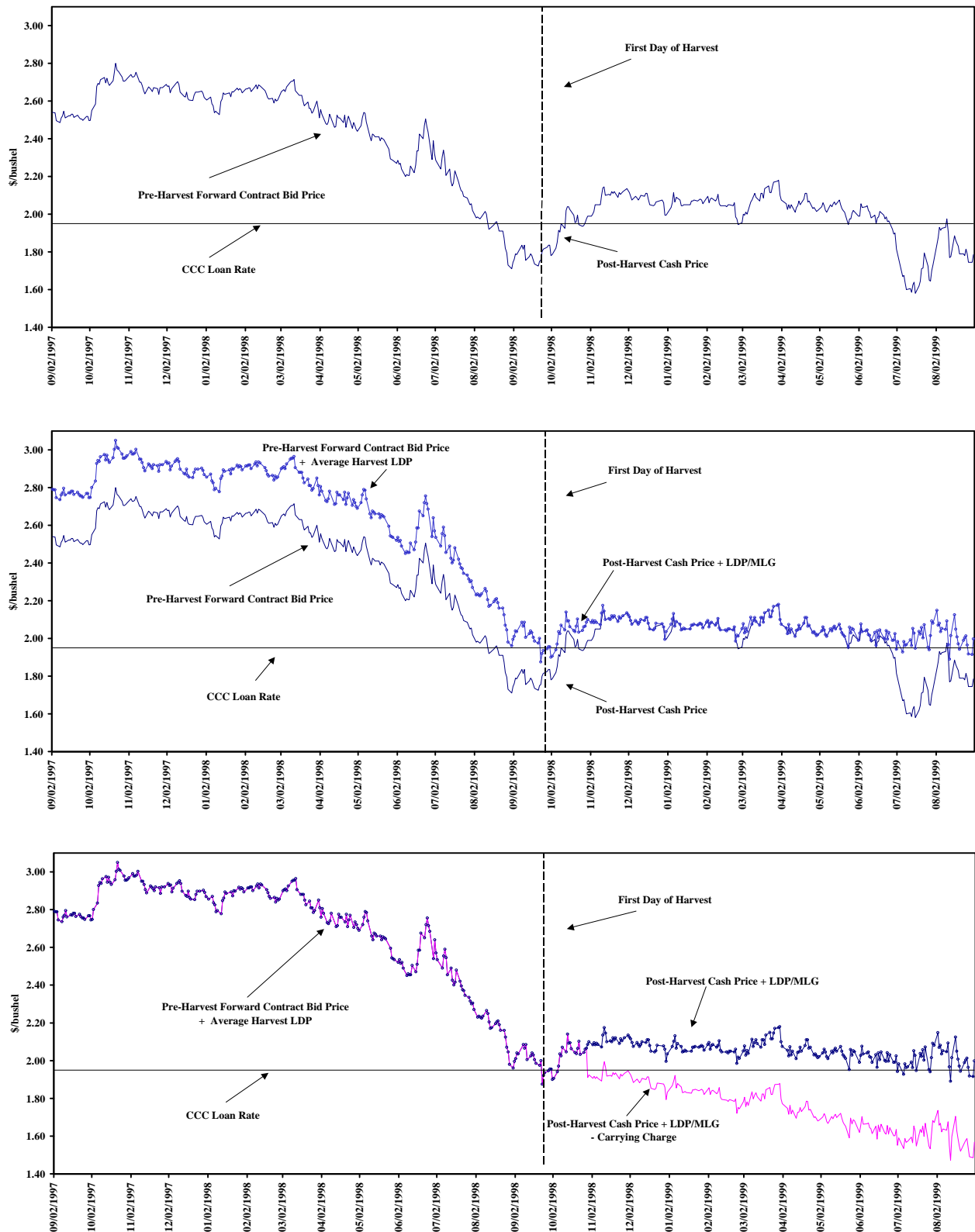


Figure 6. Daily Soybeans Prices, Central Illinois, 1998 Marketing Period

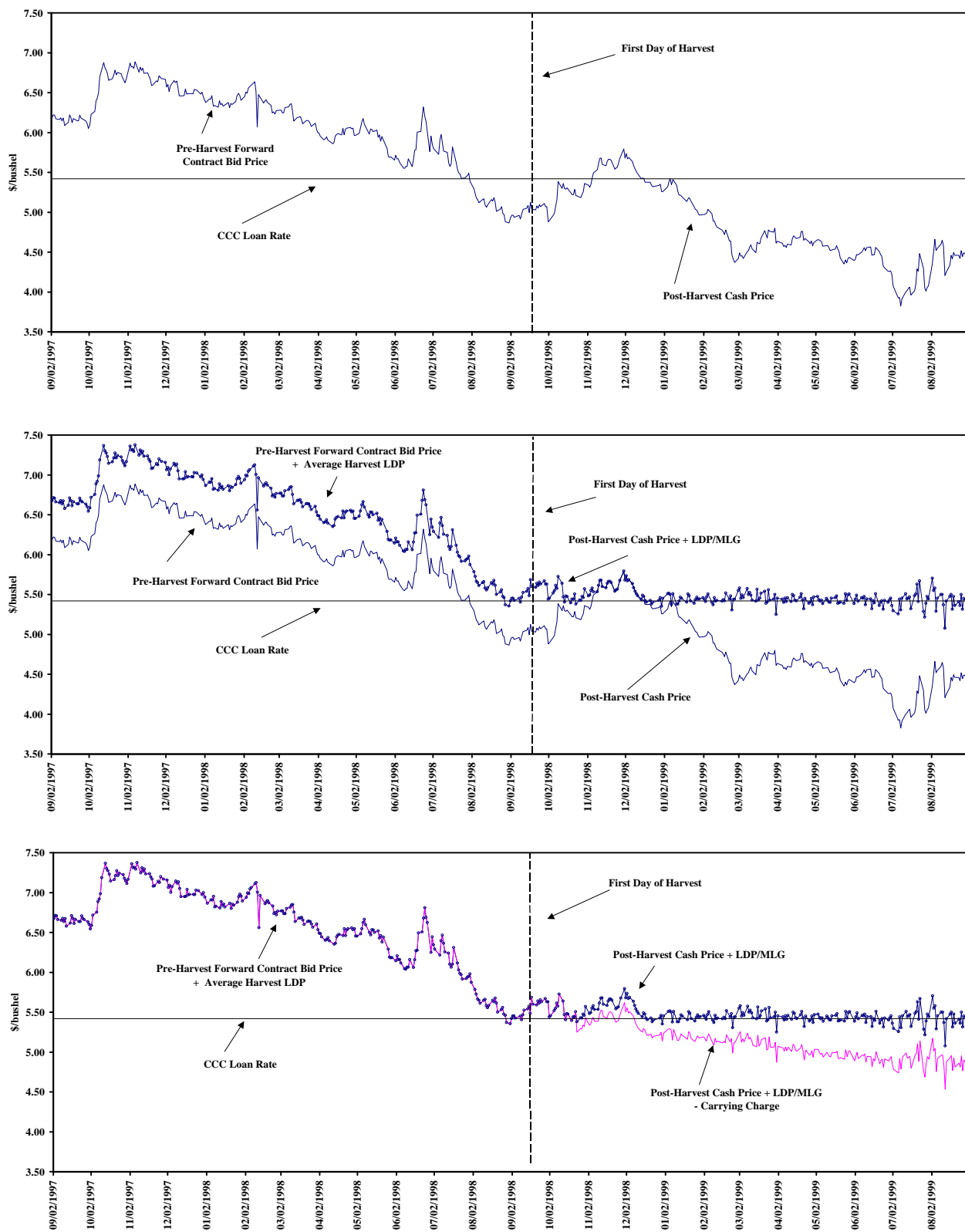


Figure 7. Comparison of Market Advisory Program Performance to Market Benchmark, Two-Year Averages, 1997-1998

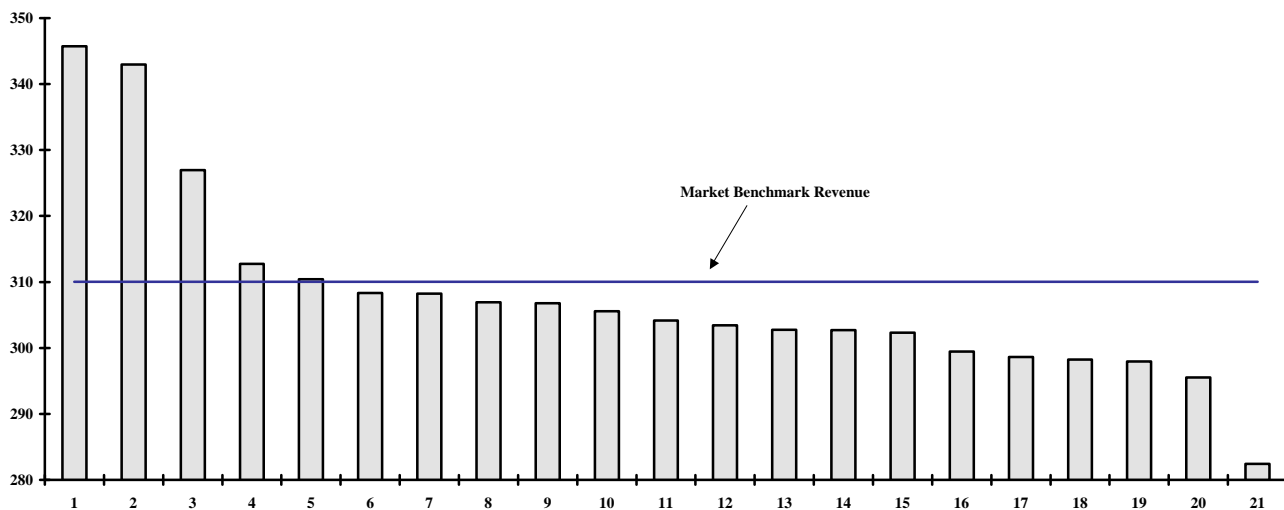
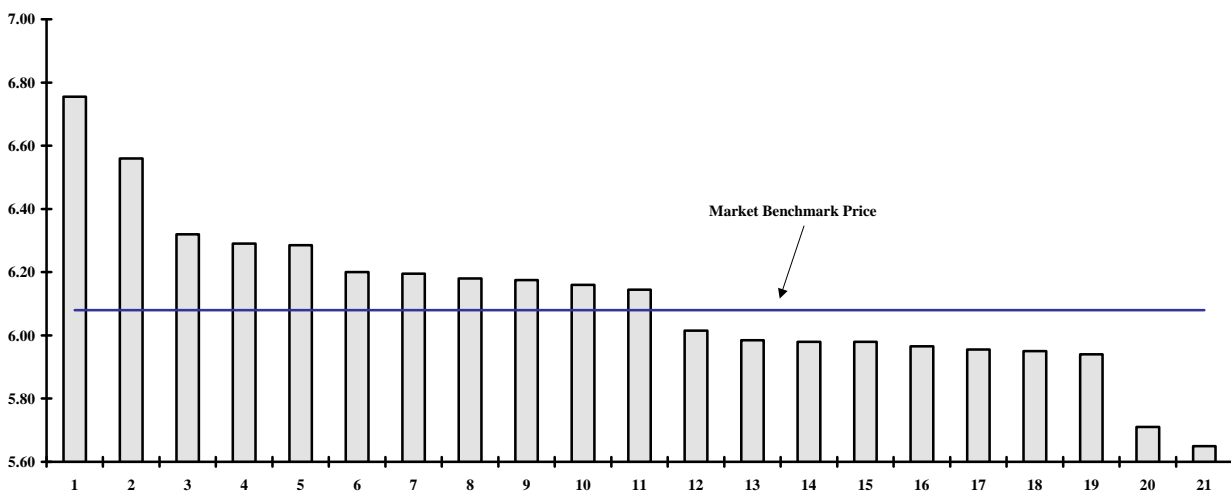
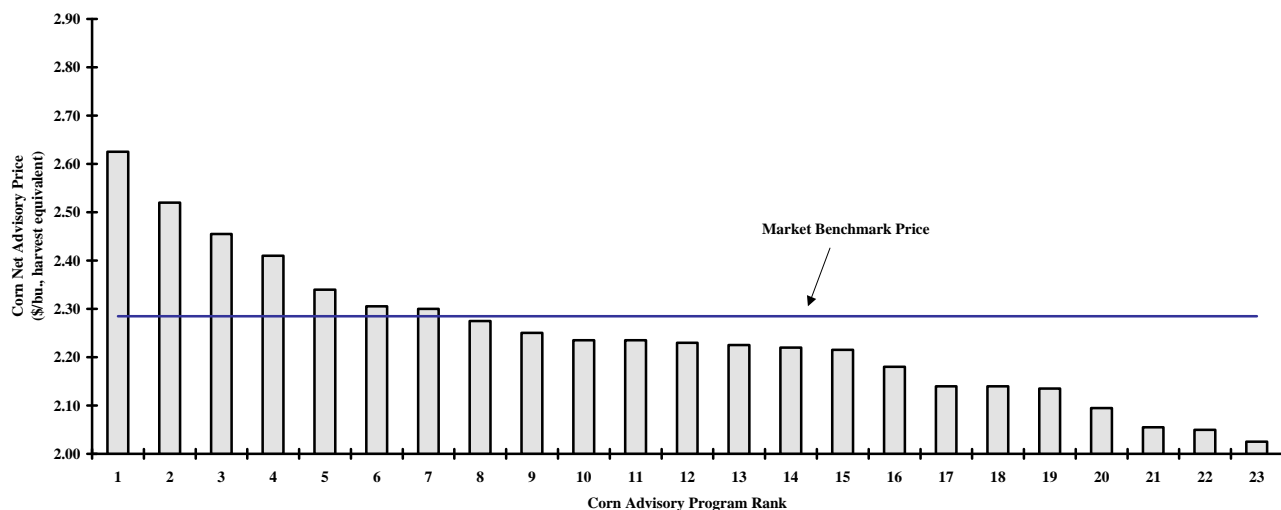


Figure 8. Comparison of Market Advisory Program Performance to Market Benchmark, Three-Year Averages, 1996-1998

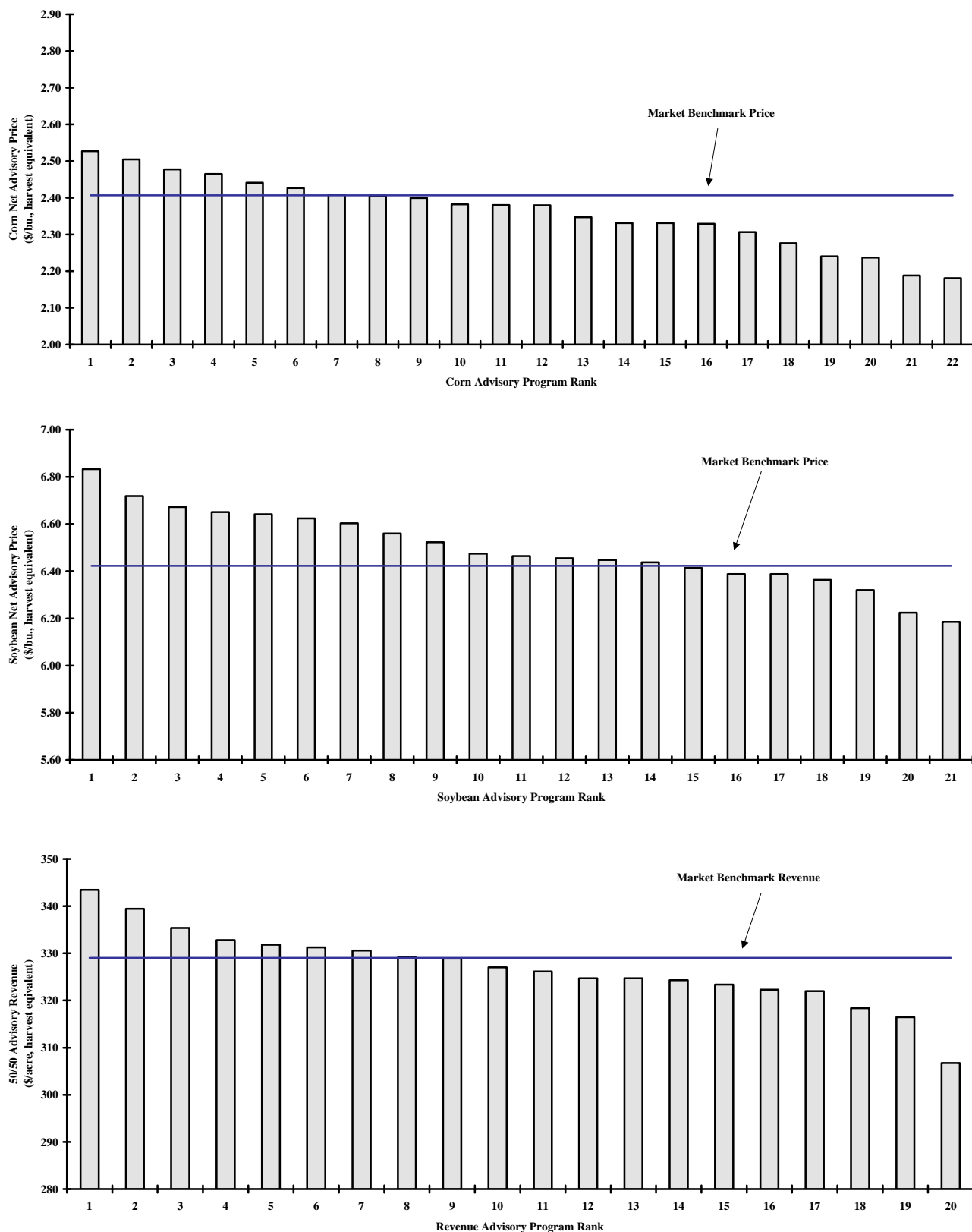


Figure 9. Comparison of Market Advisory Program Performance to Market Benchmark, Four-Year Averages, 1995-1998

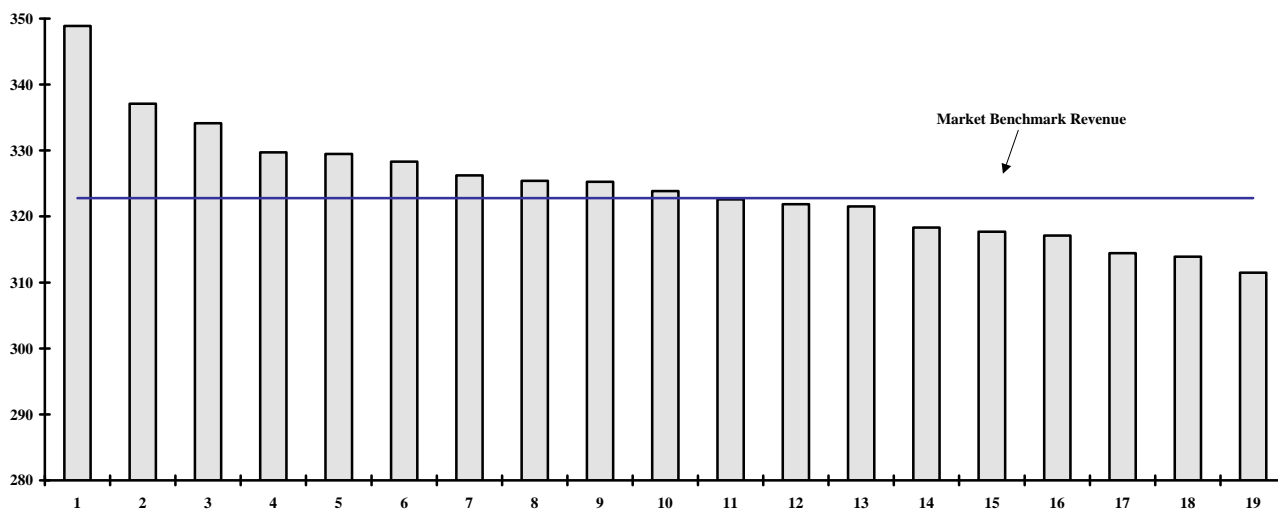
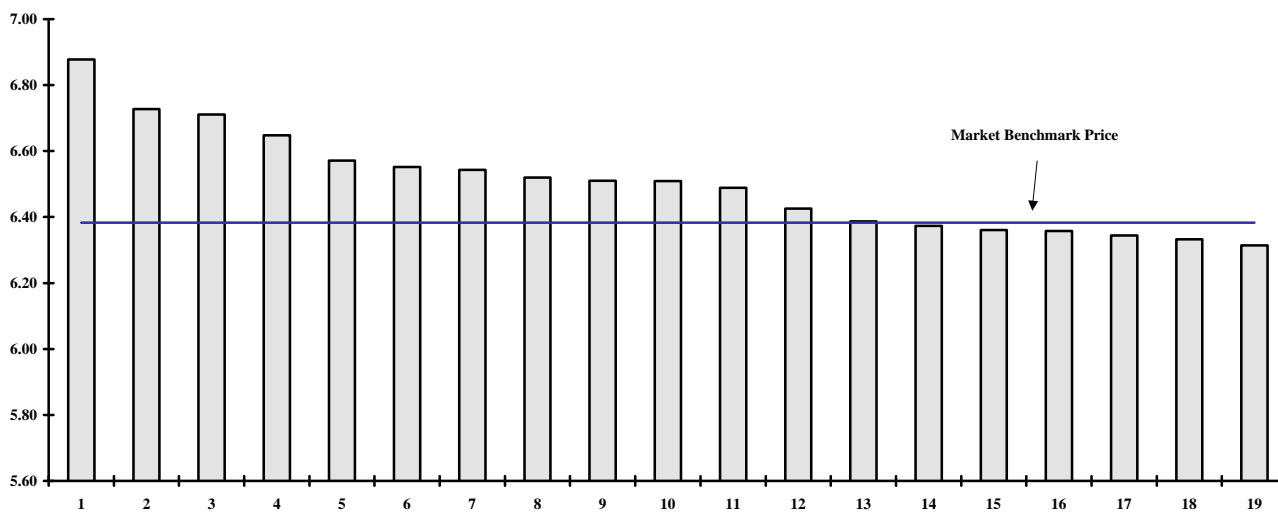
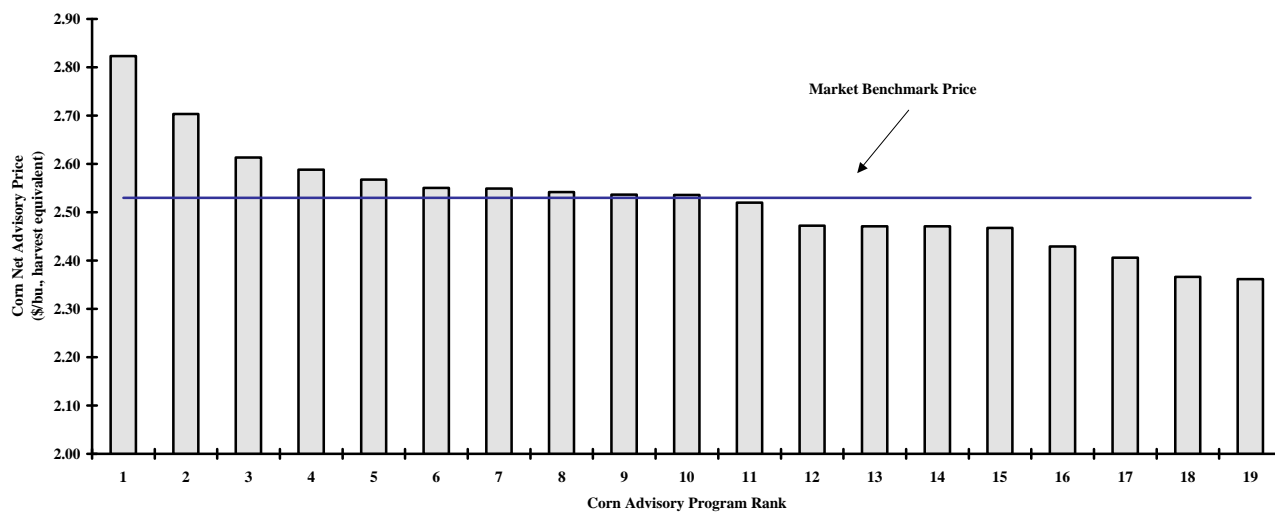


Figure 10. Average Net Advisory Price and Standard Deviation for 19 Market Advisory Programs, Corn, 1995-1998

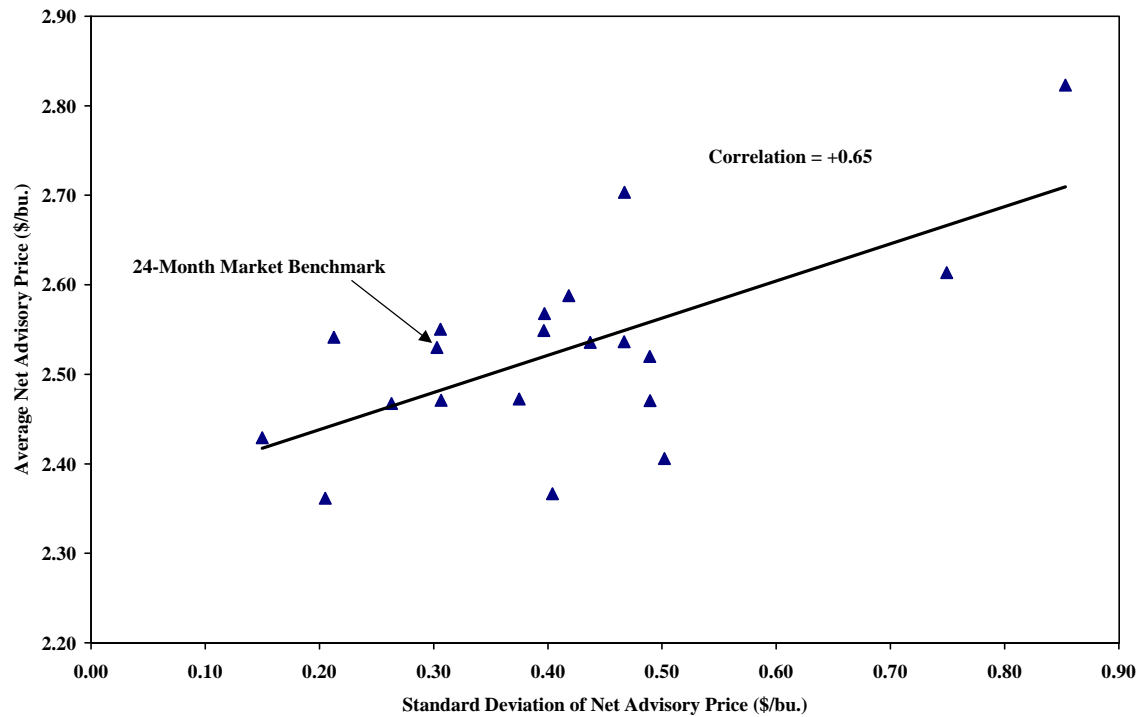


Figure 11. Pricing Performance and Risk of 19 Market Advisory Programs Relative to the 24-Month Market Benchmark, Corn, 1995-1998

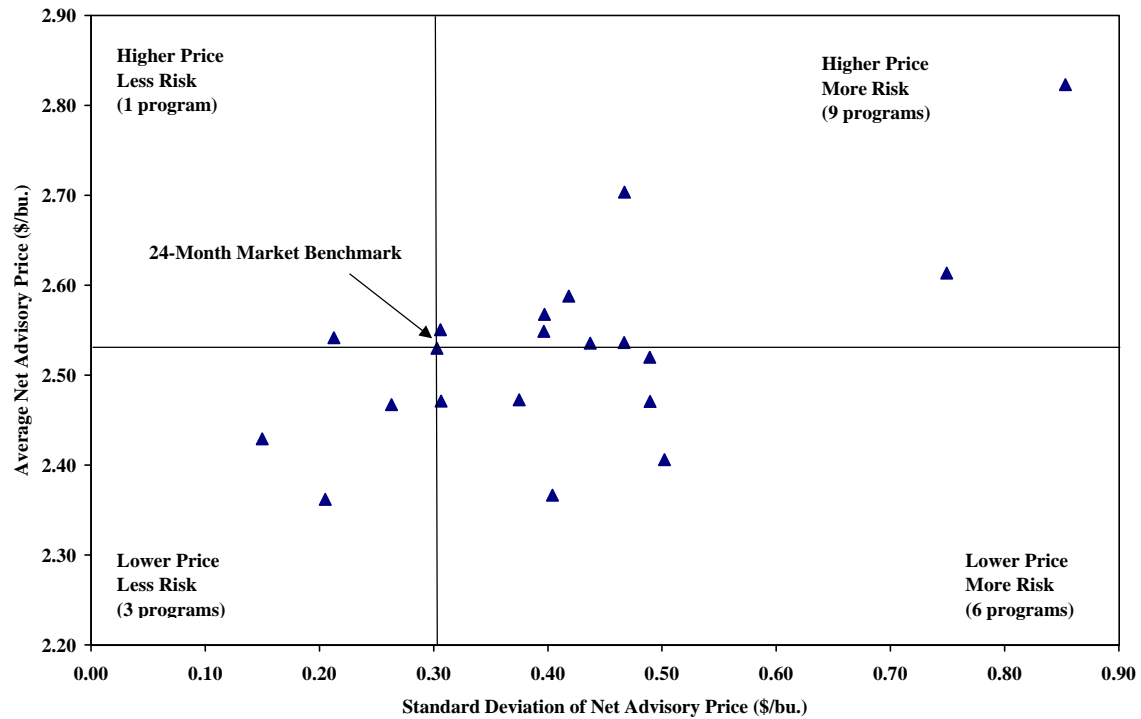


Figure 12. Average Net Advisory Price and Standard Deviation for 19 Market Advisory Programs, Soybeans, 1995-1998

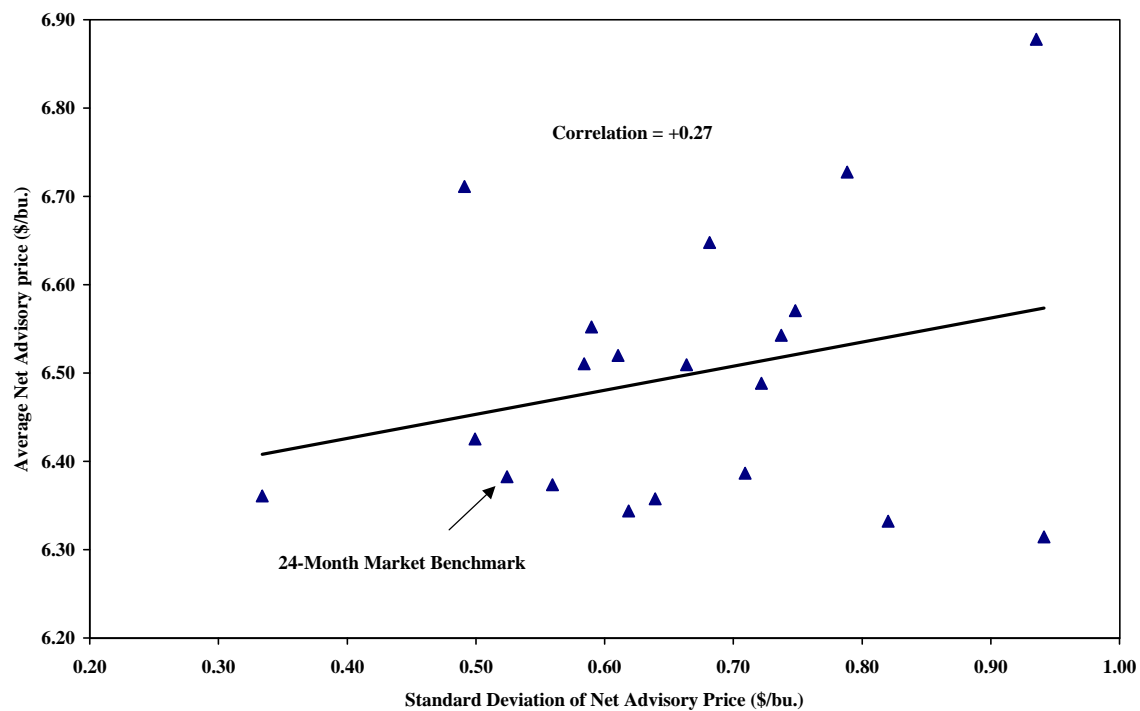


Figure 13. Pricing Performance and Risk of 19 Market Advisory Programs Relative to the 24-Month Market Benchmark, Soybeans, 1995-1998

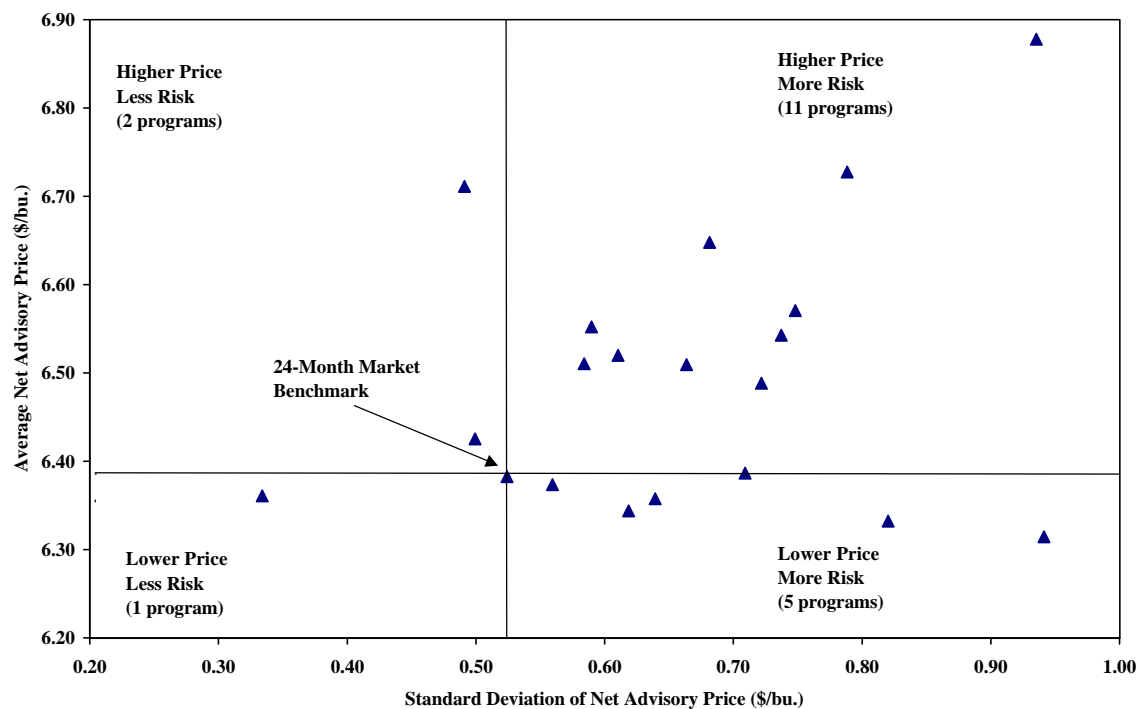


Figure 14. Average Net Advisory Revenue and Standard Deviation for 19 Market Advisory Programs, 50/50 Corn and Soybean Revenue, 1995-1998

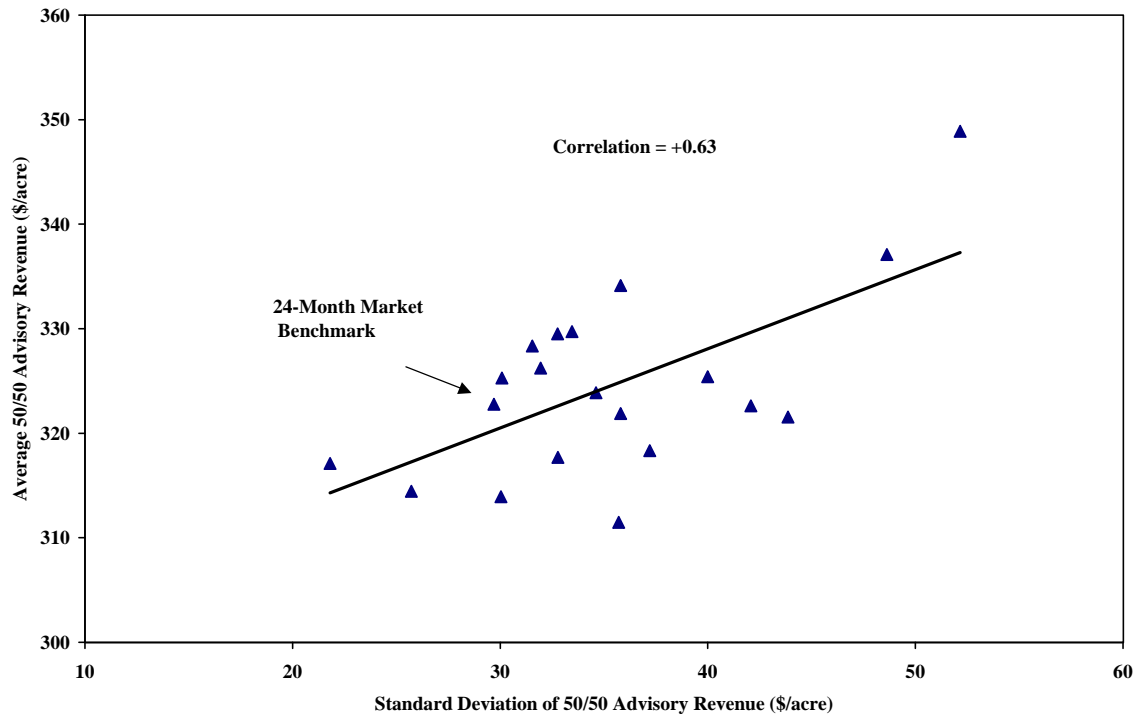


Figure 15. Pricing Performance and Risk of 19 Market Advisory Programs Relative to the 24-Month Market Benchmark, 50/50 Corn and Soybean Revenue, 1995-1998

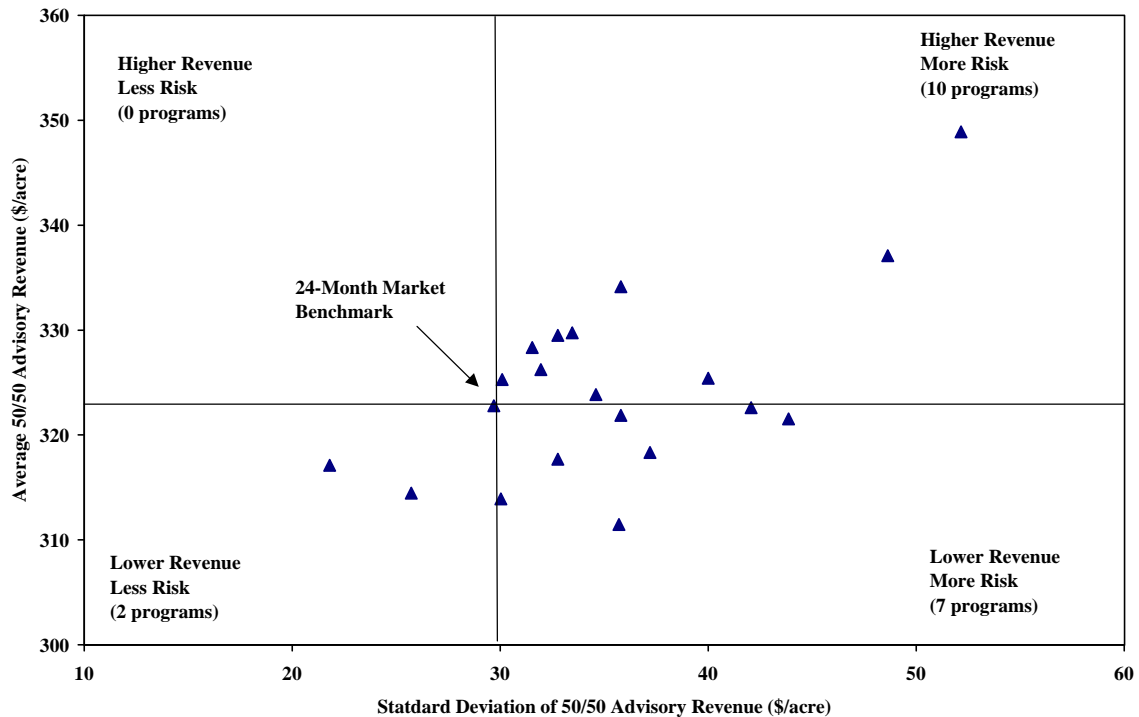


Figure 16. Pricing Performance and Risk of 19 Market Advisory Programs Relative to the 20-Month Market Benchmark, Corn, 1995-1998

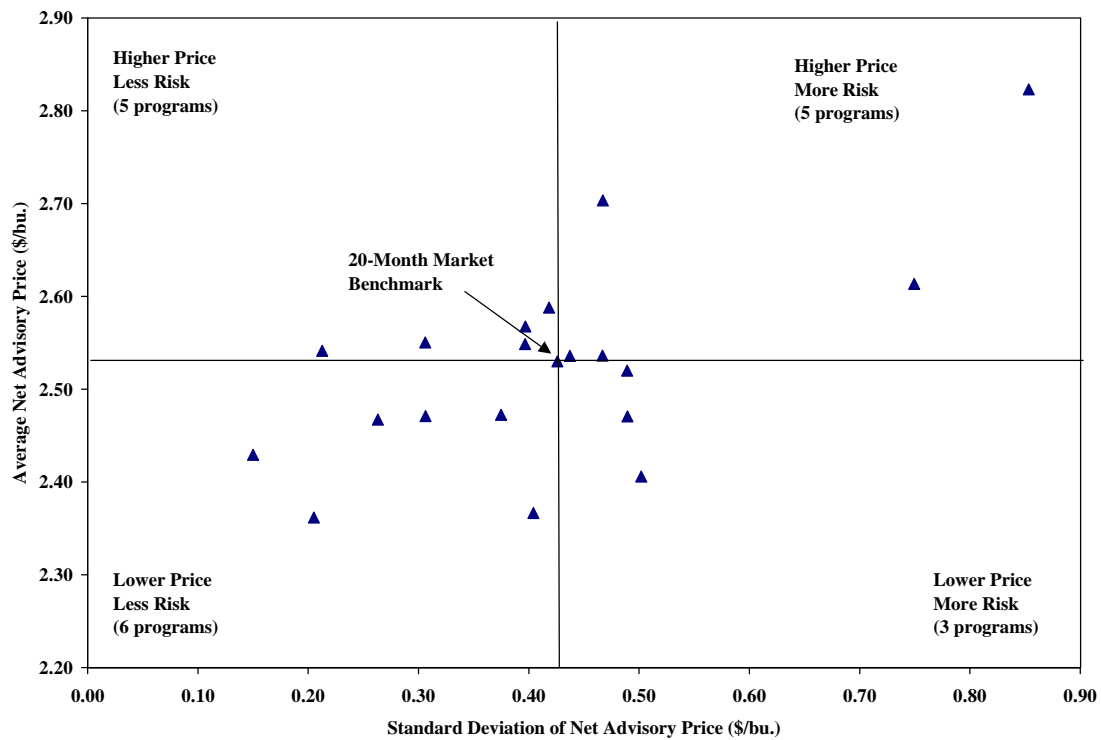


Figure 17. Pricing Performance and Risk of 19 Market Advisory Programs Relative to the 20-Month Market Benchmark, Soybeans, 1995-1998

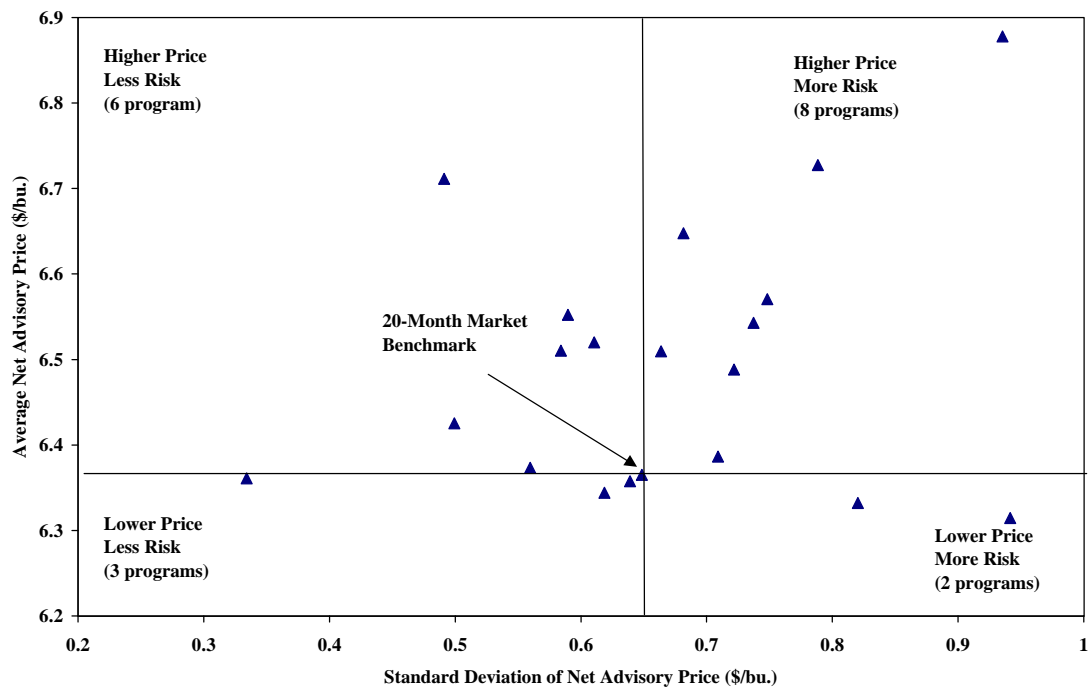


Figure 18. Pricing Performance and Risk of 19 Market Advisory Programs Relative to the 20-Month Market Benchmark, 50/50 Corn and Soybean Revenue, 1995-1998

