The Pricing Performance of Market Advisory Services in Corn and Soybeans Over 1995-2004

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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 service. 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 marketing assumptions, particularly with respect to the geographic location of production, cash and forward contract prices, fill (execution) prices for futures and options positions, expected and actual yields, storage charges and government programs.

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Abstract

The purpose of this research report is to evaluate the pricing performance of market advisory services for the 1995-2004 corn and soybean crops. Marketing assumptions applied to advisory program track records are intended to accurately depict "real-world" marketing conditions facing a representative central Illinois corn and soybean farmer. Several key assumptions are: i) with a few exceptions, the marketing window for a crop year runs from September before harvest through August after harvest, ii) on-farm or commercial physical storage costs, as well as interest opportunity costs, are charged to post-harvest sales, iii) brokerage costs are subtracted for all futures and options transactions and iv) Commodity Credit Corporation (CCC) marketing loan recommendations made by advisory programs are followed wherever feasible. Based on these and other assumptions, the net price received by a subscriber to market advisory programs is calculated for the 1995-2004 corn and soybean crops.

Market and farmer benchmarks are developed for the performance evaluations. Two market benchmarks are specified in order to test the sensitivity of performance results to changing benchmark assumptions. The 24-month market benchmark averages market prices for the entire 24-month marketing window. The 20-month market benchmark is computed in a similar fashion, except the first four months of the marketing window are omitted. Given the uncertainties involved in measuring the average price received by farmers, two alternative farmer benchmarks for central Illinois are specified. The market and farmer benchmarks are computed using the same assumptions applied to advisory program track records.

Five basic indicators of performance are applied to advisory program prices and revenues over 1995-2004. Results show that advisory program prices fall in the top-third of the price range relatively infrequently. There is limited evidence that advisory programs as a group outperform market benchmarks, particularly after considering risk. The evidence is somewhat more positive with respect to farmer benchmarks, even after taking risk into account. For example, the average advisory return relative to the farmer benchmarks is 8 to $12 per acre with only a marginal increase in risk. Even though this return is small and mainly from corn, it nonetheless represents a non-trivial increase in net farm income per acre for grain farms in central Illinois. Test results also suggest that it is difficult to predict the year-to-year pricing performance of advisory programs based on past pricing performance. However, there is some evidence that performance is more predictable over longer time horizons, particularly at the extremes of performance rankings.

The results raise the interesting possibility that even though advisory services do not appear to "beat the market," they nonetheless provide the opportunity for some farmers to improve performance relative to the market. Mirroring debates about stock investing, the relevant issue is whether farmers can most effectively improve marketing performance by pursuing "active" strategies, like those recommended by advisory services, or "passive" strategies, which involve routinely spreading sales across the marketing window.

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Introduction

Farmers in the U.S. consistently identify price risk as one of the greatest management challenges they face. For example, Smith (1989) conducts a national survey of U.S. agricultural producers and finds that 79% rate marketing as either important or very important to the financial success of their operations. Patrick and Ullerich (1996) survey Midwestern grain producers and report that price variability is the highest rated source of risk by crop producers. Coble et al. (1999) survey producers in Indiana, Mississippi, Nebraska and Texas and find that crop price variability, by a wide margin, is rated as having the most potential to affect farm income. Norvell and Lattz (1999) survey a random sample of Illinois producers and show that price risk management ranks second (following computer education and training) among ten business categories in which producers identify needs for additional consulting services.

In a related vein, a general perception exists among market observers that farmers perform poorly in managing price risk. More specifically, it is a common belief that farmers substantially under-perform the market, which is reflected by the oft-repeated adage that, "Farmers market two-thirds of their crops in the bottom third of the price range." This belief is apparently widespread even among farmers. Survey results from University of Illinois Extension meetings in December 2000 indicated that 77% of attendees agreed with the statement, "On average, corn and soybean producers market 2/3 of their crop in the bottom 1/3 of the price range." This perception is also evident in a survey of the membership of the American Agricultural Economics Association by Pope and Hallam (1986). They report that 51% of survey respondents agreed or strongly agreed with the statement, "Marketing, more than production skills, increases net farm income."

There is considerable evidence that many farmers turn to market advisory services in an effort to improve their performance in managing price risk (e.g., Sogn and Kraner, 1977; Smith, 1989; Patrick and Ullerich, 1996; Patrick, Musser and Eckman; 1998; Schroeder et al., 1998; Norvell and Lattz, 1999; Pennings et al., 2004). For a subscription fee, agricultural market advisory services provide specific pricing advice to farmers, such as when and what amount to hedge in the futures market or sell in the cash market.[1] Available estimates on the use of advisory services, marketing newsletters and marketing consultants range from 21.1% of Illinois farmers (Norvell and Lattz, 1998) to 66% of farmers nationwide (Smith, 1989). There is some evidence that farmers have been increasing their spending on market advisory services. Among Purdue's Top Farmer Workshop participants, annual expenses on marketing advice moved from the fourth highest expense for consultants to the second highest over 1991 to 2001, growing in absolute terms from $755 to $3,455 per year (Patrick, 2002). Finally, Davis and Patrick (2000),

[1] The AgMAS report by Isengildina et al. (2004) provides a thorough overview of agricultural market advisory services.

Katchova and Miranda (2004) and Pennings et al. (2004) show that the advisory services have a significant impact on the marketing practices of farmers.

A limited number of academic studies investigate the pricing performance of market advisory services.[2] In the earliest studies, Marquardt and McGann (1975) and Marquardt (1979) evaluate the accuracy of cash price predictions for 10 private and public outlook newsletters in corn, soybeans, wheat, cattle and hogs over 1970-1973. They find that futures prices generally are a more accurate source of forecasts than either the private or public newsletters. Gehrt and Good (1993) analyze the performance of five advisory services for corn and soybeans over the 1985 through 1989 crop years.[3] Assuming a representative farmer follows the hedging and cash market recommendations for each advisory service; a net price received for each year is computed and compared to a benchmark price. They generally find that corn and soybean farmers obtained a higher price by following the marketing recommendations of advisory services. Martines-Filho (1996) examines the pre-harvest corn and soybean marketing recommendations of six market advisory services over 1991 through 1994. He computes the harvest time revenue that results from a representative farmer following the pre-harvest futures and options hedging recommendations and selling 100% of production at harvest. Average advisory service revenue over the four years is larger than benchmark revenue for both corn and soybeans. Kastens and Schroeder (1996) examine the futures trading profits of seven to ten market advisory services for the 1988-1996 crop years. They report negative gross trading profits for wheat and positive gross trading profits for corn and soybeans. The authors indicate that incorporating brokerage commissions and subscription costs would have substantially diminished trading returns. Finally, Kalous, Dhuyvetter and Kastens (2005) investigate the post-harvest marketing recommendations of a single advisory service over 1970-2002 and find that the average net price for a Kansas wheat producer following the service is two cents less than the average harvest price.

While a useful starting point, previous studies have important limitations. First, the cross-section of advisory services tracked for each crop year is quite small, with the largest sample including only ten advisory services. Second, the results may be subject to survivorship bias, a consequence of tracking only advisory services that remain in business at the end of a sample period. The literature on the performance of mutual funds, hedge funds and commodity trading advisors provides ample evidence of the upward bias in performance results that can

[2] King, Lev and Nefstad (1995) examine the corn and soybean recommendations of two market advisory services for a single year. The focus of their study is not pricing performance, but a demonstration of the market accounting program *Market Tools*. Some analyses also have appeared in the popular farm press. For example, Wood (1984) and Marten (1984) examine the performance of six advisory services for corn and soybeans over 1981 through 1983. Otte (1986) investigates the performance of three services for corn over the period 1980 through 1984. Both studies indicate the average price generated by services typically exceeds a benchmark price. *Top Producer* magazine has provided evaluations of advisory services in corn, soybeans and wheat for a number of years (e.g., Powers, 1993; Smith, 2004).

[3] Throughout this report, the term "crop year" refers to the marketing window for a particular crop. This is done to simplify the presentation and discussion of market advisory service performance results. A “crop year” is more than twelve calendar months in length and includes pre-harvest and post-harvest marketing periods.

result from survivorship bias (e.g., Brown et al., 1992; Schneeweis, McCarthy and Spurgin, 1996; Brown, Goetzmann and Ibbotson, 1999). Third, the results may be subject to hindsight bias if advisory service recommendations were not collected on a "real-time" basis (Jaffe and Mahoney, 1999). Hindsight bias is the tendency to collect or record profitable recommendations and ignore or minimize unprofitable recommendations after the fact.

This discussion suggests the academic literature provides farmers with a limited basis for evaluating the performance of market advisory services. The Agricultural Market Advisory Service (AgMAS) Project was initiated in 1994 with the goal of providing unbiased and rigorous evaluation of market advisory services.[4, 5] The AgMAS Project has collected marketing recommendations for no fewer than 23 market advisory programs each crop year since the project was initiated. While the sample of advisory services is non-random, it is constructed to be generally representative of the majority of advisory services offered to farmers. Further, the sample of advisory services includes all programs tracked by the AgMAS Project over the study period, so pricing performance results should not be plagued by survivorship bias. Finally, the AgMAS Project subscribes to all of the services that are followed and records recommendations on a real-time basis. This should prevent the pricing performance results from being subject to hindsight bias.

The purpose of this research report is to evaluate the pricing performance of market advisory services for the 1995-2004 corn and soybean crops. Following the literature on mutual fund and investment newsletter performance (e.g., Metrick, 1999; Jaffe and Mahoney, 1999), two basic questions will be addressed in this study: 1) Do market advisory services, on average, outperform appropriate benchmarks? and 2) Do market advisory services exhibit persistence in their performance from year-to-year? Certain explicit marketing 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 facing a representative central Illinois corn and soybean farmer. Several key assumptions are: i) with a few exceptions, the marketing window for a crop year runs from September before harvest through August after harvest, ii) on-farm or commercial physical storage costs, as well as interest opportunity costs, are charged to post-harvest sales, iii) brokerage costs are subtracted for all futures and options transactions and iv) Commodity Credit Corporation (CCC) marketing loan recommendations made by advisory programs are followed wherever feasible. Based on these

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[5] Funding for the AgMAS project is provided by the following organizations: 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; Risk Management Agency, U.S. Department of Agriculture; Initiative for Future Agriculture and Food Systems, U.S. Department of Agriculture; and the Aurene T. Norton Trust.

and other assumptions, the net price received by a subscriber to a market advisory program is calculated for the 1995-2004 corn and soybean crops.

Five quantitative indicators of performance are applied to advisory program prices and revenues over 1995-2004. The first indicator is the proportion of advisory programs in the top-, middle- and bottom third of the price range. The second indicator is the proportion of advisory programs that beat benchmark prices. The third indicator is the average price (or revenue) of advisory programs relative to benchmarks. The fourth indicator is the average price (or revenue) and risk of advisory programs relative to benchmarks. The fifth indicator is the predictability of advisory program performance from year-to-year. Both market and farmer benchmarks are developed for the evaluations. All benchmarks are computed using the same basic assumptions applied to advisory service track records.

The next section of the report describes the procedures used to collect market advisory service recommendations. The second section describes the methods and assumptions used to simulate net advisory prices. The third section presents the methods and assumptions used to compute benchmark prices. The fourth section of the report presents 2004 pricing results for corn and soybeans. The fifth section presents a summary of the combined results for the 1995-2004 crop years. The sixth section discusses performance evaluation results for 1995-2004. The final section presents a summary and conclusions.

Please note that the results for 1995-2003 were released in earlier AgMAS research reports (e.g., Irwin, Good, Martines-Filho, and Hagedorn, 2005), while results for the 2004 crop year are new. In addition, the data collection phase of the AgMAS project is complete with the 2004 crops, and hence, this is the final performance evaluation report for corn and soybeans. Research is ongoing for other commodities tracked over 1995-2004

Market Advisory Service Recommendations

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

Five criteria are used to determine which advisory services are included in the AgMAS study. First, marketing recommendations from an advisory service must be received electronically in real time. The recommendations may come in the form of satellite-delivered pages, Internet web pages or e-mail messages. Services delivered electronically generally ensure that recommendations are made available to the AgMAS Project at the same time as farm subscribers. This form of delivery also ensures that recommendations are received in "real-time." This avoids the problem of recommendations being delivered after the date of

implementation intended by an advisory service. Such a problem could occur frequently with recommendations delivered via the postal service.

The second criterion is that a service has to provide marketing recommendations to farmers rather than (or in addition to) speculators or "traders." Some of the services tracked by the AgMAS Project do provide speculative trading advice, but that advice must be clearly differentiated from marketing advice to farmers for the service to be included. The terms "speculative" trading of futures and options and "hedging" use of futures and options are only used to identify whether a service is focused on speculators or farmers. Within a clearly defined farm marketing program, a distinction between speculative and hedging use of futures and options is not necessary.

The third criterion is that marketing recommendations from an advisory service must be in a form suitable for application to a representative farmer. That is, the recommendations have to specify the percentage of the crop involved in each transaction --cash, futures or options-- and the price or date at which each transaction is to be implemented. It is also helpful if advisory services make specific recommendations about implementation of the marketing loan program, but that is not required. Note that some advisory services evaluated by the AgMAS Project do not make any futures and options recommendations, so it is not necessary to make such recommendation to be included in the study. Services 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 for inclusion.

The fourth criterion is that advisory services must provide "blanket" or "one-size fits all" marketing recommendations so there is no uncertainty about implementation. While different programs may be tracked for an advisory service (e.g., a cash only program versus a futures and options hedging and cash program), it is not feasible to track services that provide "customized" recommendations for individual clients.[6]

A fifth criterion addresses the issue of whether a candidate service is a viable, commercial business. This issue has arisen due to the extremely low cost and ease of distributing information over the Internet, either via e-mail or a website. It is possible for an individual with little actual experience and no paying subscribers to start a "market advisory service" by using the Internet. Hence, there is a need to exclude firms that are not viable commercial concerns. At the same time, any filter in this regard should not be so restrictive that

[6] Isengildina et al. (2004) categorize market advisory services into "basic" and "customized" marketing programs. A basic program provides market analysis, information and "one-size fits all" or "generic" marketing recommendations. A customized program generally provides marketing recommendations tailored to individual client needs, direct access to market analysts, as well as the information provided to basic service subscribers. The cost for a basic program is a fixed annual fee for all commodities covered by the program, generally in the range of about $150-$600 per year. In contrast, the cost for a customized program typically is a variable amount based on production, either on per acre or per bushel basis. Isengildina et al. (2004) report costs generally range from three to five cents per bushel for customized programs. Based on these definitions, the fourth criterion for inclusion in the AgMAS study requires advisory services to be of the basic type.

newer and smaller advisory services are excluded from the AgMAS study for an unreasonably long period of time. This same issue is prevalent when evaluating the performance of other types of professional investment advisors, such as commodity trading advisors. In these cases, it is not unusual to screen firms by the length of track record and amount of funds under management.[7] An analogous screen for market advisory services can be based on the length of time the service has provided recommendations and the number of paying subscribers. The specific criterion used is that a candidate advisory service must have provided recommendations to paying subscribers for a minimum of two marketing years before the service can be included in the AgMAS study. This criterion should exclude non-viable services, while at the same time providing a relatively low hurdle for new and legitimate market advisory services.

The original sample of market advisory services 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.[8] 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 generally representative of the majority of advisory services available to farmers.

Additions and deletions to the sample of advisory services have occurred over time. Additions largely have been due to the increasing availability of market advisory services via alternative means of electronic delivery, in particular, websites and e-mail. Deletions have occurred for a variety of reasons. A total of 41 and 40 advisory service programs for corn and soybeans, respectively, have been included in the sample at some point in time. Table 1 contains the complete list of advisory programs and includes a brief explanation why each program not included for all crop years is added or deleted from the sample. The term "advisory program" is used in the remainder of this report because several advisory services have more than one distinct marketing program. For example, Agri-Edge, AgLine by Doane, Ag Market Pro, Brock, Pro Farmer and Stewart-Peterson Advisory Services each had or have two distinct marketing programs, Risk Management Group had three distinct marketing programs and AgriVisor has four distinct marketing programs. Allendale provides two distinct programs for corn, but only one for soybeans.

The total number of advisory programs evaluated for the 2004 crop year is 27 for corn and 26 for soybeans. Three programs offered by the Risk Management Group were discontinued

[7] For example, Managed Accounts Reports (MAR), a well-known provider of performance information for hedge funds and commodity trading advisors, requires that commodity trading advisors have a 12-month record of trading actual client accounts and a minimum of $500,000 under management to be tracked in their database. More specific details can be found at MAR's website (http://www.marhedge.com).

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

in March 2005. Since this program issued several recommendations for the 2004 crops by March 2005, it is included for the 2004 crop year. Two programs offered by Ag Market Pro were tracked for the first time for the 2004 corn and soybean crops.

As the above discussion implies, a number of advisory programs are not tracked for all 10 crop years over 1995-2004. Figure 1 shows the distribution of track record lengths for all 41 programs included in the AgMAS study for corn and soybeans. The distribution is quite dispersed, with six programs tracked for only one crop year and fifteen tracked all ten crop years. Track record lengths for the remaining programs are fairly evenly dispersed between two and nine crop years. Overall, the average track record length is 6.3 crop years and the median length is 6 crop years.

Three forms of survivorship bias may be potential problems when assembling an advisory program database. Survival bias significantly biases measures of performance upwards since "survivors" typically have higher performance than "non-survivors" (e.g., Brown et al., 1992; Schneeweis, McCarthy and Spurgin, 1996; Brown, Goetzmann and Ibbotson, 1999). The first and most direct form of survivorship bias occurs if only advisory programs that remain in business at the end of a given sample period are included in the sample. This form of bias should not be present in the AgMAS database of advisory programs because all programs that have been tracked over the entire time period of the study are included in the sample. The second form of survivorship bias occurs if discontinued advisory programs are deleted from the sample for the year when they are discontinued. This is a form of survivorship bias because only survivors for the full crop year are tracked. The AgMAS database of advisory programs should not be subject to this form of bias because programs discontinued during a crop year remain in the sample for that crop year.[9] The third and most subtle form of survivorship bias occurs if data from prior periods are "back-filled" at the point in time when an advisory program is added to the database. This is a form of survivorship bias because data from surviving advisory programs

[9] As shown in Table 1, the AgMAS Project stopped tracking 17 programs at some point over the 1995-2004 crop years. Eleven programs went out of business, were discontinued or merged with other programs: Ag Profit by Hjort, Agri-Edge (cash only), Agri-Edge (hedge), Cash Grain, Co-Mark, Grain Marketing Plus, Risk Management Group (cash only), Risk Management Group (futures & options) Risk Management Group (options only), Stewart-Peterson Strictly Cash and Zwicker Cycle Letter. Data collection for six additional programs was discontinued because the programs stopped providing specific cash market recommendations or recommendations were no longer deemed applicable to U.S. producers: Ag Alert for Ontario, Agri-Mark, Grain Field Report, Harris Weather/Elliot Advisory, North American Ag and Prosperous Farmer. Excluding these 17 programs from the sample could result in a form of selection bias, particularly if discontinuation is related to poor performance. Including a discontinued program for a crop year does require an assumption about marketing the cash positions remaining after the discontinuation date. A similar issue has been treated extensively in the literature on the performance of commodity funds and commodity trading advisors (e.g., Elton, Gruber and Rentzler, 1987). In this literature, if a commodity fund or trading advisor is discontinued before the end of a calendar year, some form of benchmark returns are substituted for the missing returns after the discontinuation date. Following this logic, the cash positions that remained after the date of discontinuation are sold using the same strategy as the market benchmarks utilized for this study (the details of the construction of these benchmarks are given in the "Benchmark Prices" section). In effect, this simply means that cash bushels after the date of discontinuation are sold in equal amounts over the remaining days of the crop year. Finally, note that any futures or options positions that remain open on the date of discontinuation are closed on that date using settlement futures prices or options premiums.

are back-filled. The AgMAS database should not be subject to this form of bias because recommendations are not back-filled when an advisory program is added. Instead, recommendations are collected only for the crop year after a decision has been made to add an advisory program to the database.

Another important consideration when assembling a database on advisory program recommendations is hindsight bias (Jaffe and Mahoney, 1999). This is the tendency to collect or record profitable recommendations and ignore or minimize unprofitable recommendations after the fact. Since the AgMAS Project subscribes to all of the services that are followed and records recommendations on a real-time basis, the database of recommendations should not be subject to hindsight bias. The information is received electronically, via DTN, website or e-mail. For the programs that provide multiple daily updates, information is recorded for all updates. In this way, the actions of a farmer-subscriber are simulated in real-time.

When recording recommendations of each advisory program, specific attention is paid to which year's crop is being sold (e.g., 2004 crop year), 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 2005 futures reaches $2.40). If a price target is 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. Recommendations for farm marketing programs are not screened for "speculative" versus "hedging" uses of futures and options. Consequently, all futures and options trades presented to farmers as a part of marketing recommendations are included.

As noted above, some advisory services offer two or more distinct marketing programs. This typically takes the form of one set of advice for marketers who are willing to use futures and options (although futures and options are not always used) and a separate set of advice for farmers who only wish to make cash sales.[10] In this situation, both strategies are recorded and treated as distinct strategies to be evaluated. Some programs also differentiate advice based on the availability of on-farm storage. In the past, when a service clearly differentiated strategies based on the availability of on-farm versus off-farm (commercial) storage, only the off-farm storage strategy was tracked. Starting with the 2000 corn and soybean crops, if a service clearly differentiates on-farm and off-farm storage strategies at or before harvest, both strategies are recorded.[11]

Several procedures are used to check the recorded recommendations for accuracy and completeness. Whenever possible, recorded recommendations are crosschecked against later status reports provided by the relevant advisory program. Also, at the completion of the crop

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

[11] Only one program in 2004 met this requirement for differentiating on-farm and off-farm strategies. Consequently, except for this one program, performance results for on-farm and off-farm storage costs are based on the same set of recommendations.

year, it is confirmed whether cash sales total exactly 100%, all futures positions are offset and all options positions are offset or expire.

The track records developed by the AgMAS Project provide a wealth of information on the marketing approach, or "style," of different advisory programs. While a complete analysis of marketing approach is beyond the scope of this report, a brief overview will provide valuable perspective when considering the performance evaluation results presented later in this report. A useful starting point is a simple count of the number of marketing transactions recommended by each program. Tables 2 and 3 present the number of transactions for each program and crop year in corn and soybeans.[12] The count includes all cash, forward, futures, options and marketing loan recommendations. Entry and exit transactions for futures and options positions are counted separately since many positions are entered and exited in an incremental manner. There is a wide variation in the number of recommended transactions within each crop year in both corn and soybeans. For example, the maximum number of transactions in 2004 for corn is 119 and the minimum is 7. The average number of recommended transactions across programs within a given crop year ranges from 17 to 30 in corn and 14 to 27 in soybeans. A total of over 10,000 transactions are recommended in corn and soybeans over 1995-2004.

Table 4 provides descriptive statistics on the number of recommended transactions by individual advisory program. These statistics provide the most direct evidence on the substantial differences in the number of recommended transactions by different advisory programs. In corn, the lowest average for programs active in at least two crop years is 7 transactions per crop year and the highest is 59. In soybeans, the lowest average for programs active in at least two crop years is 5 transactions per crop year and the highest is 49. The average across all programs is 20 transactions per crop year in corn and 19 transactions in soybeans, or a little less than one transaction per month over a two-year window (pre- and post-harvest) for each crop year. It is also interesting to observe the similarity in the average number of transactions across corn and soybeans for the same advisory program.

The transaction counts clearly point towards substantial differences in the marketing approach of different advisory programs. However, counts do not provide any information on the timing or magnitude of the recommended transactions. "Marketing profiles" are a useful device for aggregating the various positions a program recommends at each point in time and showing the time path of the net recommended position. Specifically, a marketing profile shows the net amount priced (sold) by an advisory program, on a cumulative basis, each day over a two-year marketing window beginning approximately one year before harvest and ending one year after harvest.[13] The profiles aggregate the futures, options and cash market positions for a program based on the well-known result that the price exposure of a portfolio of positions is a

[12] The transactions counts do not include the daily sales of any bushels remaining after a program is discontinued. As explained in footnote 9, cash positions that remain after the date of discontinuation are sold using the same strategy as the market benchmarks utilized for this study. Including these transactions would greatly exaggerate the number of transactions recommended by a program before it was discontinued.

[13] The next section contains a detailed discussion of the specification of the marketing window.

weighted-average of the price exposures of the individual positions, where the weights are the deltas of the individual positions. As a result, marketing profiles are comparable across programs and crop years.[14, 15] Note that all marketing profiles (in concept) start at zero on the first day of the marketing window and end at 100% on the last day of the marketing window.

Two marketing profile examples in corn for the 2000 crop year are presented in Figure 2. These profiles nicely illustrate the large range in marketing approaches found across advisory programs. Panel A shows a conservative program that engages in minimal pre-harvest pricing and makes a small number of pricing transactions post-harvest. Panel B shows an aggressive program, where strategies range from full to no hedging of expected production during the pre-harvest period, some periods where the net position is long during post-harvest (negative net amount priced) and very late sales of much of the cash commodity. This latter example illustrates the large time-series variation in the net amount priced (hedge ratio) often found for advisory programs; a variation much larger than what optimal hedging models typically generate (e.g., Martines-Filho, 1996). This also illustrates the frequency with which advisory programs engage in "selective hedging" strategies (Working, 1962), where hedges are placed and lifted based on price expectations. It is interesting to note that a similar type of behavior has been observed in the risk management programs of financial and non-financial corporations, where it is labeled "hedging with a view" (e.g., Stulz).

While there is a great deal of variability in marketing profiles across programs for a given crop year, there also are definite seasonal tendencies in the average profile for all programs. Figure 3 presents the average marketing profile of all advisory programs tracked in corn and soybeans over the 1995-2004 crop years. On average, the net amount of the corn and soybean crops priced before planting (May 1st) is relatively modest, about 30% in corn and 20% in soybeans. Pricing increases slowly through harvest and then tends to pick up rapidly shortly after harvest. By January 1st after harvest, the average amount priced increases to about 60% in corn and soybeans. Sales rise to an average of about 85% in corn and soybeans by the time the next crop is planted in May following harvest.

Marketing Assumptions

At the end of the marketing period, all of the (filled) recommendations are aligned in chronological order. The advice for a given crop year is considered to be complete for each advisory program when cumulative cash sales of the commodity reach 100%, 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. In order to produce a consistent and comparable set of results across the different advisory programs, certain

[14] The definition of delta is the dollar amount that the value of a position changes for a one unit increase in the price of the underlying commodity.

[15] A detailed explanation of the construction of the marketing profiles and results for individual advisory programs and crop years can be found in Martines-Filho et al. (2003a, 2003b), Colino et al. (2004a, 2004b), and Colino et al. (2006a, 2006b).

explicit marketing assumptions are made. The assumptions are intended to accurately depict "real-world" marketing conditions facing a representative central Illinois corn and soybean farmer. Based on these assumptions, the returns to each recommendation are then calculated in order to arrive at a weighted average net price that would be received by a farmer who precisely follows the marketing advice (as recorded by the AgMAS Project).

The discussion about marketing assumptions in the following sections centers on the 2004 crop year. It is important to note that some assumptions have changed over time. Specific information on assumptions for the 1995-2003 crop years can be found in earlier AgMAS pricing reports (e.g., Irwin et al., 2005). Assumed values for key variables used in the simulation of advisory service performance over the 1995-2004 crop years can be found in Appendix A.

Geographic Location

The simulation is designed to reflect conditions facing a representative central Illinois corn and soybean farmer. Whenever possible, data are collected for the Central Crop Reporting District in Illinois as defined by the National Agricultural Statistics Service (NASS) of the U.S. Department of Agriculture (USDA). The eleven counties (DeWitt, Logan, McLean, Macon, Marshall, Mason, Menard, Peoria, Stark, Tazewell and Woodford) that make up this District are highlighted in Figure 4.

Caution should be used when applying the results to other areas of the US, because yields and basis patterns may be quite different from those of central Illinois. Differences in yields and basis patterns could have a substantial impact on prices computed for farmers or advisory services in another area. The resulting change could be either up or down relative to AgMAS advisory prices and benchmarks, depending on local conditions. Appendix B to this report, entitled "A Cautionary Note on the Use of AgMAS Net Advisory Prices and Benchmarks," contains further discussion on this point.

Marketing Window

The time period over which a farmer normally makes pricing decisions for a particular crop is termed the "marketing window." It also can be referred to as the pricing "decision-horizon" or "timeline" of a farmer. A marketing window does not necessarily equal the time period of observed market activity. The reason is that not taking action (e.g., not hedging pre-harvest) is one type of decision that can be made during a marketing window.

In the present context, the objective is to define the normal marketing window of a representative farmer who subscribes to the advisory programs tracked by the AgMAS Project. Good, Hieronymus and Hinton (1980) provide a useful starting point. They define the marketing window for an Illinois grain farmer as the period extending from the initial production planning time until the end of the storage season. First production decisions in Illinois normally occur in October through November of the year preceding planting (e.g., fall tillage and application of fertilizer), while the storage season typically extends through July or August of the year following harvest. This results in a marketing window between 21 and 23 months in length. Chafin and Hoepner (2002) reach a similar conclusion in their text on commodity marketing:

> In building an integrated marketing plan, crop producers must keep in mind the fact that pricing decisions on *a single crop span a two-year period*: the growing year and the storage year. The first stage of a crop "marketing year" begins in November as production plans are being made for the new crop and continues throughout the growing season until the end of harvest. During the second stage of the "marketing year," pricing of the harvested (*old*) crop begins at the end of the 12-month "growing" year and continues for the next 12-month storage year. Thus, the pricing of a single crop spans 730 days-the "growing year" **plus** the "storage year." (p. 326)

The actual pricing pattern of advisory programs included in the AgMAS study provides further information for defining the relevant marketing window. As noted above, observed market positions cannot directly reveal the intended pricing window of a representative farmer following advisory program recommendations. However, averages over time and advisors should be suggestive as to the typical starting and ending points used to make recommendations for a crop. The average marketing profiles presented earlier in Figure 3 suggest that a farmer following the recommendations of market advisory programs included in the AgMAS study, on average, will begin making significant marketing decisions (pricing more than one percent) in September of the year before harvest and will not complete marketing until August of the year after harvest.[16]

Overall, this discussion indicates it is reasonable to assume a 24-month marketing window for a representative farmer subscribing to advisory programs. In the case of the 2004 crop, the marketing window is defined as the two-year period beginning September 2, 2003 and ending on August 31, 2005. Two further issues need to be discussed with respect to the 2004 market window. The first issue is exceptions to the specific definition. For example, six programs in corn and two programs in soybeans started hedging recommendations before September 2, 2003. The earliest case occurred in corn where the first recommendation was issued on April 2, 2003. In addition, two advisory programs in corn and two in soybeans either had a relatively small amount (10%) of cash bushels unsold as of August 31, 2003 and/or futures or options positions open in the range of 20 to 50% of production. The last of these positions was closed out on December 27, 2005. Because the marketing window is defined as the "normal" window, it is argued that a representative farmer would approach the marketing window with some flexibility, particularly for recommendations that do not extend too far outside the limits of the marketing window. While a few of the 2004 recommendations extend beyond the limits of the marketing window, most do not. All of the transactions in question are nonetheless included in the relevant advisory program's track record in the interest of

[16] It is important to emphasize that the marketing profiles in Figure 2 represent the average of all advisory programs across 10 crop years (1995-2004). The averages mask substantial variation in marketing profiles across advisory programs for a given crop year and, in some cases, across crop years for the same advisory program. Marketing profiles for individual market advisory programs can be found in Martines-Filho et al. (2003a, 2003b), Colino et al. (2004a, 2004b), and Colino et al. (2006a, 2006b).

completeness and accuracy.[17] The second issue is the definition of business days within the marketing window. This issue arises because different entities in the agricultural sector have different policies with respect to holidays. For the purposes of this study, an "official" business day within the marketing window is defined as a business day where the Chicago Board of Trade is open and cash prices are reported by the Illinois Department of Ag Market News. Finally, note that throughout the remainder of this report the term "crop year" is used to represent the two-year marketing window.

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**.**[18] 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 Market News. The North and South Central Illinois Price Reporting Districts are highlighted in Figure 5. Prices in this 35-county area best reflect prices for the assumed geographic location of the representative central Illinois farmer (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 are available from this source for the 2004 corn and soybean crops during the February 9, 2004 through August 31, 2004 period.

The marketing window for the 2004 corn and soybean crops begins in September 2003. Since the Illinois Department of Ag Market News did not begin to report actual cash forward bids until February 9, 2004 for 2004 crops, pre-harvest prices need to be estimated for the first five months of the marketing window. For dates between September 2, 2003 and February 6, 2004, a three-step estimation procedure is adopted. First, the average forward basis for the first five days the Illinois Department of Ag Market News reports actual forward contract bids is computed (February 9-13, 2004 for 2004 crops).[19] Second, the forward basis is widened in a

[17] It is acknowledged that recommendations outside of the two-year marketing window could exceed the flexibility of a representative farmer. For example, it seems unreasonable to assume a representative farmer would hold stocks more than a year after the end of the marketing window. Because there are no hard-and-fast rules for making such decisions, exceptions are considered on a case-by-case basis.

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

[19] The average forward basis (cash forward prices for fall delivery minus December 2004 corn or November 2004 soybeans futures prices) over February 9 - 13, 2004 was -$0.1935 per bushel for corn and -$0.2225 per bushel for soybeans. A weekly version of the basis data is published at the following website: http://www.farmdoc.uiuc.edu/marketing/basis/index.asp.

linear fashion moving back in time from February 2004 to September 2003. This is based on the findings in several studies that the forward basis for corn, soybeans and wheat widens systematically the more distant the time before harvest (Harris and Miller, 1981; Elam and Woodworth, 1989; Brorsen, Coombs and Anderson, 1995; Townsend and Brorsen, 2000; Shi et al., 2004). The widening "factor" for 2004 crops is estimated based on the average change in weekly forward basis bids for central Illinois over the 1973-2004 pre-harvest periods (0.054¢ per bushel per week for corn and 0.094¢ per bushel per week for soybeans).[20] The weekly change is converted to a daily change by dividing the estimated averages by five (0.011¢ per bushel per day for corn and 0.019¢ per bushel per day for soybeans). The resulting adjustment to the estimated forward basis (and estimated forward contract bids) is rather modest. For example, the widening adjustment on the first day of the marketing window (September 2, 2003 for the 2004 crops) is about one cent per bushel for corn and two cents per bushel for soybeans.[21] Third, the estimated forward basis computed in the previous two steps is added to the settlement price of the Chicago Board of Trade (CBOT) new crop futures prices for the 2004 crop year (2004 December corn futures contract or 2004 November soybean futures contract) between September 2, 2003 and February 6, 2004.

The estimation procedure outlined above 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. In addition, the estimation procedure typically is applied to a relatively small number of transactions. For example, the average net amount sold by advisory programs before February 1st over 1995-2004 is only 14% for corn and 8% for soybeans, and many of these transactions are in futures or options contracts rather than forward contracts.

Some market advisory programs recommended the use of post-harvest forward contracts to sell part of the 2004 corn and soybean crops. The Illinois Department of Ag Market News reported post-harvest bids for January and March 2005 deliveries. These central Illinois bids are used wherever applicable. However, 16 positions recommended by advisory programs for the 2004 corn and soybean crops either did not match the January or March delivery period or were made before the Illinois Department of Ag Market News began reporting post-harvest forward contract prices. The following procedure was adopted to estimate the additional post-harvest forward contract prices needed in these cases. 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

[20] See Shi et al. (2004) for an in-depth discussion of issues related to estimating the trend component in pre-harvest forward basis bids.

[21] Note that estimated pre-harvest forward basis bids for similar periods over 1995-2001 are not widened by the same factor. This procedure was first introduced for the 2002 and 2003 crops.

beginning of the section) to arrive at an estimated post-harvest forward contract price for central Illinois. This same procedure was used in a few cases for the 1998, 1999, 2002 and 2003 crop years.

Advisory program recommendations to enter and exit futures and options positions may take a variety of forms, including market orders, limit-price orders, sell-stop orders and buy-stop orders.[22] For example, one program made the following recommendation on April 1, 2004: "Sell November soybean futures at the market to hedge 50% of expected 2004 production." As another example, a different program made the following recommendation on May 10, 2005: "Repurchase 50% of the 2004 corn crop by buying July corn futures at $2.08." The first is an example of a market order while the second is an example of a limit-price order. In most cases, advisory programs report "fill" prices for executed transactions. All reported fill prices are cross-checked against the price range of the relevant futures or options contract on the same date. If the fill price for any type of order is within the daily range, it is entered as the executed price for the recommended transaction. If the fill price for a market order is outside the daily range, the settlement price for same day is recorded as the executed price. If the fill price for a limit-price, sell-stop or buy-stop order is outside the daily range, then the recommended transaction is not included in the track record. In addition, price targets for limit-price (as in the second example above), sell-stop and buy-stop orders are cross-checked against the daily price range of the relevant futures or options contract on the reported fill date. If the price target and associated fill price (generally the same) are within the daily price range, then the reported fill price is used. If the price target is not in the daily range, then the recommended transaction is not included in the track record. Finally, in cases where a program does not report a specific fill price, the settlement price for the same day is used.

"Catch-up" transactions may be necessary when a recommended position is not included in an advisory program's track record due to the cross-check described in the previous paragraph. For limit-price, sell-stop and buy-stop orders, the price target is checked on subsequent days and the position is assumed to be executed at the target if it is hit. If the target is never hit, then the next recommended position is adjusted upwards or downwards to reflect the excluded bushels.[23] If the purpose of an excluded transaction is to close a position and no further related positions are recommended, the settlement price at contract expiration is used to exit the original position.

[22] See Chapter 4 in Purcell and Koontz (1999) for a thorough discussion of the different types of orders used in futures and options markets.

[23] A similar situation can arise when advisory programs make cash sale recommendations (spot or forward) conditional on meeting a futures price target. In these cases, price targets are cross-checked against the daily price range of the relevant futures contract on the reported cash sale date. If the price target is within the daily price range, then the cash sale is recorded in the track record. If the target is not in the daily range, then the sale is not made and the next recommended cash sales transaction is adjusted upwards to reflect the excluded bushels.

Quantity Sold

Since most of the advisory program recommendations are given in terms of the proportion of total production (e.g., "sell 5% of 2004 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% 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 farmers, it is unlikely that this assumption adversely affects the accuracy of the results. This may not be the case for small- to intermediate-scale farmers who are less able to sell in 5,000-bushel increments.[24]

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 current year 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 for 2004 is based upon a log-linear regression trend model of actual yields from 1972 through 2003 for the Central Illinois Crop Reporting District. Previous research suggests this type of trend model provides a reasonable fit to corn and soybean yield data (Swanson and Nyankori, 1979; Fackler, Young and Carlson, 1993; Sherrick et al., 2004).

In central Illinois, the expected yield for corn is calculated to be 161.3 bushels per acre in 2004. Therefore, recommendations regarding the marketing quantity made prior to harvest for the 2004 crop year are based on yields of 161.3. For example, a recommendation to forward contract 20% of expected 2004 production translates into a recommendation to contract 32.3 bushels per acre (20% of 161.3). The actual reported corn yield in central Illinois is 186 bushels per acre in 2004. The same approach is used for soybean evaluations. The calculated 2004 trend yield for soybeans in central Illinois is 49 bushels per acre and the actual yield is 54 bushels per acre.

It is assumed that after harvest begins, farmers can make reasonably accurate projections of realized yields. Therefore, recommendations made after the start of harvest are assumed to be

[24] The practical importance of "lumpiness" problems even for small farms may be limited, due to the availability of "mini-contracts" at the Chicago Board of Trade. These futures and options contracts are specified in 1,000-bushel increments.

based on actual yields instead of expected yields. Since harvest does not occur during the same exact period each year, data on harvest progress are needed to establish the relevant harvest window, and in particular, the date that harvest begins. Harvest progress data are reported by NASS for the central Illinois Crop Reporting District; however, the reports typically are not made available soon enough to identify precisely the beginning of harvest. Consequently, the exact "location" of the harvest window cannot be identified based upon available data. The following alternative procedure is used to estimate the harvest window each year. First, the business day nearest to 50% completion of harvest is defined as the mid-point of harvest. Second, the entire harvest period is defined as a five-week window, beginning twelve business days before the mid-point of harvest, and ending twelve business days after the mid-point of harvest (a total of 25 business days, or five weeks). In most years, the five-week window includes at least 80% of the harvest.

Since NASS harvest progress reports are made weekly, the exact date of the harvest mid-point is not known. However, it is possible to estimate the date of the mid-point using the weekly progress numbers of the two reports that encompass 50% harvest progress. As an example, the NASS estimate of corn harvest progress in central Illinois is 38% on September 26, 2004. Harvest progress is estimated to be 62% in the next report on October 3, 2004. A daily progress estimate for this week can be constructed by taking the difference of these estimates and dividing the result by seven; in this example, harvest progressed at rate of approximately 3.43% per day. Counting forward from 38% at a rate of 3.43% per day, the business day closest to 50% progress is September 30, 2001. This mid-point is used to construct the harvest window for corn by counting backwards and forwards twelve business days. The same procedure is used to determine the harvest window for soybeans.

The harvest period for corn in 2004 is defined as September 14, 2004 through October 18, 2004. For soybeans, the harvest period is September 15, 2004 through October 19, 2004. Therefore, recommendations for corn made after September 14, 2004 are applied on the basis of the actual yield of 186 bushels per acre. For soybeans, recommendations made after September 15, 2004 are applied on the basis of the actual yield of 54 bushels per acre.

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 during the 2004 crop year, if a program advises forward contracting 50% of the corn crop prior to harvest, this translates into sales of 80.65 bushels per acre (50% of 161.3). However, when the actual yield is applied to the analysis, sales-to-date of 80.65 bushels per acre imply that only 43.36% of the actual crop has been contracted (80.65/186*100). 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% increment of the 2004 crop, making the total recommended sales 60% of the crop, the recommendation is adjusted to 16.64% of the actual yield (30.95 bushels), so that the total crop sold to date is 60% of 186 bushels per acre (80.65 + 30.95 = 111.6 = 0.6*186). After this initial adjustment, subsequent recommendations are taken as percentages of

the 186 bushels per acre actual yield, so that sales of 100% of the crop equal sales of 186 bushels per acre.

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 2004 corn futures contract for 25% of the 2004 crop prior to harvest. Since the amount hedged is based on the trend yield assumption of 161.3 bushels per acre, the futures position is 40.32 bushels per acre (25% of 161.3). After the yield assumption is changed, this amount represents a short hedge of 21.68% (40.32/186). The amount of the futures position is not adjusted to move the position to 25% 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.

If actual yield is substantially below trend, and forward pricing obligations are based on trend yields, a farmer may have difficulty meeting such obligations. This raises the issue of updating yield expectations in "short" crop years to minimize the chance of defaulting on forward pricing obligations. This situation was not encountered in the AgMAS evaluations of corn and soybeans over the 1995-2004 crop years but did arise in earlier evaluations for wheat. Please see the AgMAS research report by Jirik et al. (2000) for a detailed discussion of the issue and associated adjustment procedures.

Hedging Costs

Several costs are associated with hedging positions in futures and options markets. Brokerage commissions are the first type of hedging cost incurred when farmers open or close positions on an exchange. 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 and options contracts are used, which have a contract size of 5,000 bushels. Therefore, per-bushel brokerage costs are 1.0¢ per bushel for a round-turn futures transaction and 0.6¢ per bushel for each options transaction.

Liquidity costs are the second type of hedging cost incurred when farmers open or close positions on an exchange. These costs reflects the fact that non-floor traders generally must buy at the ask price and sell at the bid price (e.g., Working, 1967; Roll, 1984). The difference between the bid and ask prices, termed the bid-ask spread, is the return earned by floor traders for "making the market." In other words, the bid-ask spread represents the cost paid to execute a trade quickly at prevailing market prices. Liquidity costs are not explicitly accounted for in this study because fill prices for futures and options transactions are reported by advisory programs for most transactions. Fill prices presumably already reflect liquidity costs. In cases where a program did not report a specific fill price, the settlement price for that day is used. Liquidity costs are not incorporated for settlement transactions, but this should not represent a significant omission since such transactions are a relatively small component of all futures and options transactions. In addition, liquidity costs should be minimized during the settlement period of the daily trading session due to the relatively high trading volume that typically occurs at that time (e.g., Thompson, Eales and Seibold, 1993).

Mark-to-market costs are a third type of hedging cost that may be incurred by farmers in the course of holding futures and options positions on an exchange. These costs can be incurred as a result of the margining system used for futures and some options positions. Specifically, when a farmer opens a futures position a "good faith" margin deposit is required, typically around 5% of contract value. The initial margin can be deposited in the form of available cash, borrowed funds or an interest bearing instrument such as U.S. treasury bills. So, depending on the form of the deposit, the farmer may experience interest opportunity costs, actual interest costs or interest earnings on the initial margin. If the futures position subsequently accrues losses beyond a certain point (e.g., the futures price increases while holding a short position) a further margin deposit is required. In this way, it is possible for interest borrowing costs to accumulate as losses are experienced. If the futures position subsequently accrues gains, no further margin deposit is required but interest may be earned on the accrued profits. The process of marking-to-the market for futures positions occurs daily and is based on settlement futures prices. The question in the present context is the magnitude of mark-to-the market costs for futures positions in agricultural markets. Previous studies suggest that mark-to-market costs are quite small for hedging positions in agricultural futures markets (Nelson, 1985; Alexander, Musser and Mason, 1986; Matthews and Holthausen, 1991). This is a sensible result in reasonably efficient markets, as hedging profits, which generate interest earnings, should over time approximately offset hedging losses, which generate interest charges. Mark-to-market costs are therefore not incorporated in the simulation of advisory program performance for this study.

It is important to emphasize that the above discussion is not meant to imply that cash flow risk is not an important component of the risk of following advisory program recommendations. While interest costs and earnings for a margin account more than likely cancel each other out over time, hedge positions can still generate large negative cash flows during particular time periods. Zulauf et al. (2001) examine routine pre-harvest marketing strategies for representative Ohio corn and soybean producers over 1986-1999 and find that cash outflow during short crop years can be substantial. For example, cash outflow for a standard short hedging strategy (50% of expected production at planting) during the drought of 1988 exceeds $100 per acre. This highlights the potential for large cash outflows that may result from following advisory program recommendations.

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 farmers in program crops such as corn and soybeans was not eliminated entirely. Minimum prices are established through a "loan" program. Specifically, if market prices are below the Commodity Credit Corporation (CCC) loan rate for corn or soybeans, farmers can receive payments from the U.S. government that make up the difference between the loan rate and the lower market price.[25] There is considerable flexibility in the way

[25] 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.

the loan program can be implemented by farmers. This flexibility presents the opportunity for advisory programs to make specific recommendations for the implementation of the loan program. Additionally, the price of both corn and soybeans was below the loan rate during significant periods of time in the 1998/99-2001/02 and 2004/05 marketing years, 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. Finally, all of the advisory programs tracked by the AgMAS project for the 2004 crop year make specific recommendations regarding the timing and method of implementing the loan program for the entire corn and soybean crops.

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 LDP is $0.50 per bushel. If the PCP increases to $1.60 per bushel, the LDP will decrease to $0.40 per bushel. Conversely, if the PCP decreases to $1.40 per bushel, the LDP will increase to $0.60 per bushel.[26]

LDPs are made available to farmers over the period beginning with corn or soybean harvest and ending May 31st of the calendar year following harvest. Farmers have flexibility with regard to taking the LDP, because 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 choose to take the LDP before the crop is delivered and sold. Note that LDPs cannot be taken after a crop has been delivered and title has changed hands.

The second mechanism is the non-recourse 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, farmers 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.

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[26] Technically, the USDA computes LDPs for the current date using PCPs for the previous day.

Farmers 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. In this case only, 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. In this latter case, interest is based on the loan rate. Under the second alternative, the farmer stores the crop to loan maturity and then transfers title to the CCC. The farmer retains the proceeds from the initial loan.

The non-recourse loan program establishes the county loan rate as a minimum price for the farmer, as does the LDP program. For the 2004 crop, the sum of LDPs plus marketing loan gains was subject to a payment limitation of $150,000 per person. Forfeiture on the loans or use of commodity certificates provide a mechanism for receiving a minimum of the loan rate on bushels in excess of the payment limitation.

The average loan rates for the 2004 corn and soybean crops across the 11 counties in the Central Illinois Crop Reporting District are $2.01 and $5.14 per bushel, respectively. Spot cash prices for corn fall below the loan rate during most of the 2004 post-harvest period. Spot cash prices for soybeans fall below the loan rate only during the early post-harvest period. This is reflected in Figure 6, which shows corn and soybean LDP or MLG rates for central Illinois during the 2004 post-harvest period.[27, 28]

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.

[27] LDP and MLG data were obtained from the interactive LDP database at the Center for Agricultural and Rural Development (CARD) at the Iowa State University (http://www.card.iastate.edu/).

[28] The time period for each chart begins on the first day of harvest, as determined for this study, and ends on August 31, 2005. The first day of corn harvest is assumed to be September 14, 2004 for the 2004 crop. The first day of soybean harvest is assumed to be September 15, 2004 for the 2004.

Various assumptions could be implemented regarding harvest progress during this window. Lacking more precise data, a reasonable assumption is that harvest progress for an individual representative farm is a linear function of time.

Tables 5 and 6 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 fourth 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 farmer forward contract 50% of expected corn production. This translates into 80.7 bushels per acre when the percentage is applied to expected production (0.50*161.3 = 80.7). Next, convert the bushels per acre to a percentage of actual production, which is 43.3% (80.7/186 = 0.434). To determine the LDP payment on the 43.3% of actual production forward contracted, simply read down Table 5 to September 28, 2004, which is the date when 43.3% of harvest is assumed to be complete. The average LDP up to that date (September 14, 2004- September 28, 2004) is $0.20 per bushel; the last column of Table 5. 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. Grain industry practices may actually offer more flexibility in establishing LDPs than is assumed here. In addition, so long as prices remain below the loan rate, 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 31st but after harvest are not placed under loan. Those crops receive program benefits, if any, through LDPs. After May 31st, eligible crops (unpriced crops for which any program benefits have not yet been collected) are assumed to be under loan until priced only if cash prices prevailing on May 31st are near or below the loan rate.

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, LDPs 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, although not all buyers require that forward contract bushels be delivered first. 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 5 and 6. 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.* The use of futures contracts to price during the pre-harvest seasons 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 31st*. If a spot cash sale of corn or soybeans is recommended before May 31st but after harvest, it is assumed that the LDP, if positive, is established that same day.

8) *Loan program after May 31st.* Since LDPs are not available after May 31, 2005, it is assumed that any corn 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 corn prices are near the loan rate in central Illinois on May 31, 2005 and a prudent farmer would take advantage of the price protection offered by the loan program.[29] When the corn bushels 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 the nine-month loan period. Note also that the $150,000 payment limitation is not considered in the analysis, as production is based on one acre of corn. The same procedures are not used for the 2004 soybean crop since the spot price for soybeans is well above the loan rate in central Illinois on May 31, 2005. A prudent farmer would not necessarily enter the loan program under these circumstances, and hence, when soybeans are subsequently priced (cash sale, forward contract, short futures, or long put option), no marketing loan gain is assigned on that day.

Storage Costs

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 consists of two components: physical storage costs and the opportunity cost incurred by foregoing sales when the crop is harvested. Physical storage costs depend on the type of storage available and the horizon used by a farmer to make storage decisions. From a representative farmer's perspective, there are four relevant physical storage scenarios: i) on-farm storage using a short-run decision-horizon, ii) off-farm (commercial) storage using a short-run decision-horizon, iii) on-farm storage using a long-run decision-horizon and iv) off-farm (commercial) storage using a long-run decision-horizon. Short-run in this context is defined to be one storage season, usually the ten-month period after the harvest of a particular crop. Long-run is defined to be any decision-horizon longer than one storage season. In each of the previous scenarios, the physical storage charge should be the relevant marginal cost of physical storage (Williams and Wright, 1991). In contrast, interest opportunity cost should be the same regardless of the type of physical storage used or whether a short- or long-run decision-horizon is considered.

Early AgMAS pricing reports consider only one scenario: commercial storage using a short-run decision-horizon. Starting with the 2000 crop year, net advisory prices and benchmarks are computed using physical storage costs applicable to each of the four storage scenarios. In all cases for 2004, storage and interest charges are assigned beginning October 19, 2004 for corn and October 20, 2004 for soybeans, the first dates after the end of the respective 2004 harvest windows. It should be noted that the cost of drying corn to 15% moisture and the cost of drying soybeans to storable moisture are not included in the calculations. This cost is

[29] It is recognized that, in practice, not all farmers follow this procedure. Actual loan entries in May have been small in most years.

incurred whether the grain is stored or sold at harvest, or whether the grain is stored on-farm or off-farm. Therefore, this cost is irrelevant to the analysis and excluded.

The first scenario considered is on-farm storage and a short-run decision-horizon. Because pre-existing storage facilities are assumed to be available on-farm, the marginal cost of physical storage equals the on-farm variable cost of physical storage. Estimates of the on-farm variable cost of physical storage are drawn from a recent study conducted at Kansas State University (Dhuyvetter, Hamman and Harner, 2000). The estimates assume storage occurs in a 25,000 bushel round metal bin, the "medium-sized" storage capacity examined in the Kansas State study. The first component of on-farm physical storage is a flat charge of 6.7¢ per bushel for conveyance, aeration, insecticide and repairs. The flat charge is applied to both corn and soybeans and reflects the fact that most physical costs of on-farm storage are "one-time" in nature. That is, once the decision is made to store, most costs are pre-determined and do not vary with the length of storage.

The second component of on-farm physical storage is shrinkage. Corn shrinkage is assumed in the Kansas State study to start at one-percent per bushel for the first month of storage and increase at a rate of one-tenth of one percent for each month stored thereafter. For example, if corn is stored six months, the total shrinkage is assumed to be 1.5% per bushel. Agricultural engineering specialists at the University of Illinois and Purdue University indicated that the on-farm shrink schedule for corn used in the Kansas State study is reasonable. In addition, the schedule is consistent with published research about shrinkage of corn stored on-farm (Hurburgh et al., 1983). Given that the harvest-time cash price of corn in central Illinois for 2004 is $1.82 per bushel, the shrink charge assigned to corn stored on-farm for one-month in 2004 is 1.82¢ per bushel ($1.82*0.01*100). The shrink charge in 2004 is increased 0.182¢ per bushel ($1.82*0.001*100) for each additional month of storage.[30]

Since the Kansas State study did not estimate shrinkage costs for soybeans, the same agricultural engineering specialists noted above were consulted for a reasonable estimate. This turned out to be a constant 0.25% per bushel shrink factor. Given that the harvest-time cash price of soybeans in central Illinois for 2004 is $5.02 per bushel, the flat shrink charge assigned to soybeans in 2004 is 1.26¢ per bushel ($5.02*0.0025*100).[31]

As noted earlier, storage costs include the physical cost of storage and interest opportunity costs. The convention in farm marketing studies is to compute interest costs using a measure of borrowing rates for farm operating loans (e.g., Hieronymus, 1966; Good, Hieronymus and Hinton, 1980; Chafin and Hoepner, 2002). While usually unstated in farm marketing studies, it is implicitly assumed that farmers either forgo the opportunity to pay down existing operating loans or borrow new operating funds if grain is not sold at harvest. Based on this argument, the interest rate for the current study is the typical rate for "New Farm Loans: Other Operating Loans" at Seventh Federal Reserve District (which includes Illinois)

[30] On-farm shrink charges are not applied to corn sold via a pre-harvest forward contract or harvest spot sale.

[31] On-farm shrink charges are not applied to soybeans sold via a pre-harvest forward contract or harvest spot sale.

agricultural banks in the fourth calendar quarter of each year.[32] Interest rates for the fourth quarter are assumed to most accurately reflect actual opportunity costs on farm operating loans related to storage. The total interest charge for storing grain on-farm is computed as the harvest price times the interest rate compounded daily from the end of harvest to the date of sale. Specifically, interest costs in 2004 are computed using 2004 harvest cash prices for corn and soybeans and an annual interest rate of 6.8%.[33]

The second scenario considered is storage off-farm at commercial facilities and a short-run decision-horizon. The marginal cost of physical storage in this case is the sum of commercial storage, drying and shrinkage charges. As in the past, storage costs at commercial elevators in 2004 are drawn from an informal telephone survey of nine central Illinois elevators.[34] Based on this information, physical commercial storage charges are assumed to be a flat 13¢ per bushel from the end of harvest through December 31. After January 1, physical storage charges are assumed to be 2¢ per month (per bushel), with this charge pro-rated to the day when the cash sale is made. The drying charge to reduce corn moisture from 15% to 14% is a flat 2¢ per bushel, while the charge for shrinkage is 1.3% per bushel.[35] The cost of commercial shrinkage is based on the harvest price (no shrinkage is assumed for soybeans in commercial storage). Given that the harvest-time cash price of corn in central Illinois for 2004 is $1.82 per bushel, the charge for volume reduction is 2.37¢ per bushel ($1.82*0.013*100). Therefore, the flat shrink and drying charge assigned to all stored corn in 2002 is 4.37¢ per bushel.[36] Interest opportunity cost is computed using the same procedures and assumptions as outlined above for on-farm storage.

The third and fourth scenarios shift to a long-run decision-horizon, where the on-farm scenario is applicable to a farmer considering the construction of new on-farm storage facilities and the commercial scenario is applicable to a farmer that plans on using commercial storage

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[32] The source is the *Agricultural Finance Databook*, published by the Board of Governors of the Federal Reserve Board. (http://www.federalreserve.gov/releases/e15/)

[33] The daily interest rate, r, is computed as: $r = (1.068)^{1/365} - 1 = 0.0001803$ or 0.01803% per day.

[34] Commercial storage costs, as measured by the telephone survey, have not changed over the 10 years of the AgMAS study (1995-2004). It appears that commercial elevator storage charges have been stable for a substantial period of time. A 1982 survey of Illinois elevators by Hill, Kunda and Rehtmeyer (1983) revealed an average flat charge for storage of corn and soybeans from harvest through January of 12.9¢ per bushel and 14.2¢ per bushel, respectively. The average monthly storage charge after January was 2.1¢ per bushel for corn and 2.4¢ per bushel for soybeans. The average drying charge for corn was 2.3¢ per bushel. The majority of the surveyed elevators were located in central Illinois. These costs are similar to the costs used by the AgMAS study for the 1995 through 2004 crop years.

[35] The commercial drying charge is not applied to corn that is sold via a pre-harvest forward contract or harvest spot sale. Also, note that on-farm variable costs of storage do not include the cost of drying corn from 15% down to 14% moisture. This charge is assumed to only apply to post-harvest storage at commercial facilities.

[36] The commercial shrink charge is not applied to corn that is sold via a pre-harvest forward contract or harvest spot sale.

facilities over the long-run. Since all costs are variable in the long-run, the relevant marginal physical storage cost in both of these scenarios is the total cost. Dhuyvetter, Hamman and Harner (2000) estimate the on-farm fixed cost of physical storage for a 25,000 bushel round, metal bin to be 14.6¢ per year. This fixed cost can be added to the on-farm variable cost estimate discussed earlier to compute the total physical cost of on-farm storage. Presumably, commercial physical storage charges paid by farmers reflect total variable and fixed costs of storage at commercial facilities. Consequently, the commercial storage costs discussed earlier in the context of short-run decisions also represent long-run commercial physical costs.

A comparison of the estimated costs of storage for corn and soybeans in the 2004 crop year is found in Tables 7 and 8, respectively. The first item of note is that the on-farm variable cost of physical storage changes little for corn as the storage length increases and is constant for soybeans as the storage length increases. The reason is the previously mentioned "one-time" nature of most physical costs of on-farm storage. As shown in panels A and B of Figure 7, this results in a "non-linear" relationship between on-farm variable costs of storage per month and the length of storage. For example, the on-farm variable cost for corn stored two months after harvest in 2004 is about 5¢ per month. This can be compared to the on-farm variable cost of corn stored six months after harvest of about 2.5¢ per month. The second item of note is the much lower level of on-farm variable costs versus commercial storage costs. Of course, this is not surprising given that variable on-farm storage costs do not include fixed costs, while commercial storage costs presumably reflect total variable and fixed storage costs at commercial facilities. The third item of note is the similar level of total on-farm costs (variable plus fixed) and total commercial costs for all but the shortest and longest storage lengths. Figure 7 illustrates these findings on a per month basis. This result is not surprising assuming reasonably competitive conditions in the market for storage. If total on-farm storage costs were substantially less than total commercial costs, this would encourage a rapid expansion of on-farm storage and *vice versa*. In fact, the proportion of on-farm versus off-farm storage capacity in Illinois has been roughly equal for a number of years.[37] This is consistent with a basic equilibrium in the storage market where total on-farm costs and commercial costs are about the same.

Given the information presented in Tables 7 and 8, it is possible to compute net advisory prices and benchmarks under each of the four storage scenarios described at the beginning of this section. It turns out that only two sets of storage costs are necessary to represent all four scenarios. Most obviously, on-farm storage costs in the short-run are estimated by on-farm variable storage costs (fourth column in Tables 7 and 8). Commercial storage costs in the short-run and long-run can be estimated by commercial storage costs (last column in Tables 7 and 8). Based on the equilibrium argument made above, on-farm storage costs in the long-run can also be estimated based on commercial storage costs. Therefore, in the remainder of this report, reference will be made only to on-farm variable storage costs and commercial storage costs.

[37] Based on estimates reported in USDA December stocks reports, on-farm and off-farm storage averaged 52 and 48% of total storage capacity in Illinois over 1995-2004. There is no discernable trend in the proportions and they vary little from year-to-year.

The calculation of storage 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 31st, 2005 when un-priced grain for which loan benefits have not been collected can be placed under loan until priced.[38] 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).

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 because it would not substantially impact the results due to the small interest opportunity costs involved.

A final issue related to storage costs is the use of different strategies based on the availability of on-farm storage. Specifically, as noted earlier in the "Data Collection" section, advisory programs may issue one set of recommendations assuming on-farm storage is available and another set of recommendations assuming only commercial storage is available. From a practical standpoint, the alternative strategies must be differentiated before grain is placed in on-farm or commercial facilities. After harvest, when grain has already been placed in on-farm or commercial storage facilities, such advice is of little practical value to most farmers. Hence, if a program clearly differentiates on-farm and commercial storage strategies at or before harvest of the 2004 crops, the on-farm recommendations are used in computing the net advisory price under on-farm variable costs and the commercial recommendations are used in computing the net advisory price under commercial costs. In this case, the net advisory price for a program under the two alternative storage cost assumptions will vary due to the difference in costs and underlying strategies. If a service does not clearly differentiate on-farm and commercial storage strategies during harvest of the 2004 crop, the same recommendations are used in computing net advisory prices under on-farm variable and commercial storage costs. In this case, the net advisory price for a program under the two alternative storage cost assumptions will vary only due to the difference in costs, as the underlying strategies are the same.[39]

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[38] Since cash prices for corn (but not soybeans) during the June 1, 2005 through August 31, 2005 period are both above and below CCC loan rates, different procedures are used for computing interest opportunity costs on redemption dates where the cash price for corn is below the loan rate and *vice versa*. For redemption dates when the cash price for corn is below the relevant CCC loan rate, no interest opportunity cost is charged. This reflects the fact that interest is not charged on CCC loans for redemption days where the cash price is below the loan rate. For redemption dates when the cash price for corn is above the relevant CCC loan rate, the CCC loan must be re-paid with interest. Interest opportunity cost in this case is computing using the CCC interest rate for the 2004 crop during June-August 2005 (4.375%).

[39] Only one program in 2004 met the requirement for differentiating on-farm and off-farm strategies. Consequently, except for this one program, performance results under on-farm and off-farm storage costs are based on the same set of recommendations.

Summary

Based on the marketing assumptions discussed in previous sections, a weighted-average net price for corn and soybeans is computed for each advisory program included in a particular crop year. It should be interpreted as the harvest-equivalent net price received by a farmer who exactly follows the marketing advice for a given program (as recorded by the AgMAS Project). The price is stated on a harvest-equivalent basis because post-harvest sales are adjusted for physical storage and interest opportunity costs. An example will help illustrate the computation of net advisory prices. The highest net advisory price for soybeans in 2004 (assuming commercial storage costs) is $7.45 per bushel. As shown in Figure 8, this price is computed as the unadjusted cash sales price ($5.96) minus commercial storage costs ($0.15) plus futures and options gains ($1.66) minus brokerage costs ($0.09) plus marketing loan benefits ($0.06).

Please note that the marketing recommendations attributed to each advisory program represent the best efforts of the AgMAS Project staff to accurately and fairly interpret the information made available by each 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 program, 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 program or another subscriber due to differences in marketing assumptions, particularly with respect to the geographic location of production, cash and forward contract prices, fill (execution) prices for futures and options positions, expected and actual yields, storage charges and government programs.[40]

Benchmarks

The essential concept underlying performance evaluation of market advisory programs is fairly simple: the comparison of the net prices generated by advisory programs with prices that could have been obtained by a farmer through one or more appropriate alternative strategies (Sharpe, Alexander and Bailey, 1999, p. 829). The comparison strategies are commonly referred to as benchmarks because they serve as objective standards of performance, much like a yardstick provides an objective measurement of distance. Within this broad framework, two basic types of performance evaluation can be applied to market advisory programs. The first type is based on comparison to "peer-group" benchmarks, whereby net advisory prices are compared to each other or the average price across all advisory programs. The second type is based on comparison to "external" benchmarks, whereby net advisory prices are compared to prices from strategies that do not depend upon market advisory program behavior. In financial

[40] See Appendix B of this report for a detailed discussion about the appropriate use of net advisory prices and benchmarks.

markets, it is commonplace to compare investment performance to external benchmarks, such as the Dow-Jones Industrials Index, S&P 500 Index and Wilshire 5000 Index.

The AgMAS study focuses on performance evaluation using external benchmarks. While peer-group evaluation provides useful information about the rank of advisory programs, it cannot answer the question of whether performance of advisory programs as a group or an individual advisory program is "superior" or "inferior" in an absolute economic sense. To answer this question, external benchmarks must be specified based on theories of market pricing.

The first class of external benchmarks is based on the theory of efficient markets. This theory assumes that market participants are rational and that competition instantaneously eliminates all profitable arbitrage opportunities. In its strongest form, efficient market theory predicts that market prices always fully reflect available public and private information (Fama, 1970). The practical implication is that no trading strategy can consistently beat the return offered by the market (e.g., Brorsen and Anderson, 1994; Brorsen and Irwin, 1996; Zulauf and Irwin, 1998; Tomek and Peterson, 2005). Hence, the return offered by the market becomes the relevant benchmark. In the context of the AgMAS study, a market benchmark should measure the average price offered by the market over the marketing window of a representative farmer who follows advisory program recommendations. The average price is computed in order to reflect the returns to a naïve, "no-information" strategy of marketing equal amounts of grain each day during the marketing window. The difference between advisory prices and the market benchmark measures the value of advisory service information. The theory of efficient markets predicts this difference, on average, will equal zero.[41]

If all market participants are rational in the way efficient market theory assumes, then the only interesting external benchmarks are market benchmarks. However, there is growing evidence that many market participants may not be fully rational in the efficient market sense. Hirshleifer (2001) provides a comprehensive review of the judgment and decision biases that appear to affect securities market investors, such as framing effects, mental accounting, anchoring and overconfidence. He also provides an exhaustive review of empirical studies that attempt to measure the potential impact of such biases on securities prices and investment returns. As an example, Barber and Odean (2000) find that individual stock investors under-perform the market by an average of one-and-a-half percentage points per year, an economically significant amount, particularly when viewed over long investment horizons. They argue that a combination of overconfidence and excessive trading explains this finding. Brorsen and Anderson (2001) provide an illuminating discussion of how judgment and decision biases may impact farm marketing. Finally, new "behavioral" theories of market pricing have been developed based on the assumption that market participants are subject to judgment and decision biases (e.g., Daniel, Hirshleifer and Subrahmanyam, 1998).

[41] Weaker versions of the theory of efficient markets predicts advisory services may profit to the degree they have superior access to information and/or superior analytical ability (e.g., Zulauf and Irwin, 1998). While logically appealing, it is quite difficult, if not impossible, to specify market benchmarks based on weaker versions of the theory because it requires knowledge of the average access to information and analytical ability of market participants.

Behavioral market theory suggests that the average return actually achieved by many market participants may be less than that predicted by efficient market theory, due to the judgment and decision biases that plague most participants. As a result, the average return actually received by market participants becomes an appropriate external benchmark. In the context of the AgMAS study, a behavioral benchmark should measure the average price actually received by farmers for a crop. The difference between net advisory prices and a farmer benchmark should then measure the value of market advisory service information relative to the information used by farmers. Behavioral market theory does not predict a specific value for this difference. It may be positive, negative or zero, depending on the impact of judgment and decision biases on advisory programs versus farmers. Finally, it is important to emphasize that the farmer benchmark should be based on the pricing performance of farmers who do not follow the advisory programs tracked by the AgMAS Project, otherwise, the value of market advisory service information relative to the information used by farmers cannot be "cleanly" disentangled.

It is important to re-iterate that market and farmer benchmarks convey quite different information about the performance of market advisory programs, even though both are forms of an external benchmark. This should be carefully considered when making performance comparisons based on the two types of benchmarks. In addition, there are some desirable properties from a practical perspective that both types of benchmarks should possess: i) they should be relatively simple to understand and to calculate; ii) they should represent the returns to a marketing strategy that can be implemented by farmers; and iii) they should be directly comparable to net advisory prices (Good, Irwin and Jackson, 1998).

Market Benchmarks

As pointed out in the previous section, a market benchmark is designed to measure the average price offered by the market to farmers. The appropriate time period for computing the average price is the marketing window of a farmer who follows the recommendations of the advisory programs included in the AgMAS study. This window was defined earlier (see the "Marketing Window" section) as the 24-month period that begins on September 1st of the year before harvest and ends on August 31st of the year after harvest. A 24-month market benchmark is simply computed as the average price over the two-year marketing window. It should be noted that this specification of a market benchmark is substantially different than common practice of using the average harvest price as a market benchmark. The analysis found later in this section implies that using the average price during a relatively short time period, such as harvest, may introduce excessive year-to-year variation in the benchmark.

Figure 9 presents average marketing profiles for market benchmarks and advisory programs in corn and soybeans over the 1995-2004 crop years. For comparison purposes, average marketing profiles for 24- and 20-month market benchmarks are included. The 20-month benchmark simply deletes the first four months of the 24-month marketing window from the computations of the average market price. As a result, this benchmark is based on the average price over the period that begins on January 1 of the year of harvest and ends on August 31 of the year after harvest. For both corn and soybeans, the market benchmarks appear to provide a surprisingly good "fit" to the average profile of the advisory programs. More specifically, if a simple linear trend regression is fit to the average profile of the advisory

programs (not shown), the estimated trend line is remarkably close to the 24-month benchmark for corn and the 20-month benchmark for soybeans.

The results discussed in the previous paragraph suggest there is some uncertainty about specification of the most appropriate market benchmark for corn and soybean performance evaluations. Leamer (1983) argues persuasively (and famously) that in this type of situation it is crucial to understand the "fragility" of results when key assumptions are changed. Consequently, both a 24-month and a 20-month market benchmark will be used in comparisons to net advisory prices. Cash forward prices for central Illinois are used during the pre-harvest period, while daily spot prices for central Illinois are used for the post-harvest period. The same forward and spot price series applied to advisory program recommendations are used to construct both market benchmarks. Details on the forward and cash price series can be found in the earlier "Prices" section of this report.

Three adjustments are made to the daily cash prices to make the 24-month and 20-month average cash price benchmarks 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 daily prices. This adjustment is consistent with the procedure described previously in the "Yields and Harvest Definition" 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 on-farm variable or commercial storage costs (physical storage, shrinkage and interest) from post-harvest spot cash prices. The daily storage charges are calculated in the same manner as those for net advisory prices. The third adjustment is made with respect to the loan program. In the context of evaluating advisory program recommendations, it was argued earlier that a "prudent" or "rational" farmer would 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" farmer will take advantage of the price protection offered by the loan program when following the benchmark average price strategy. Based on this argument, the 24-month and 20-month average cash price benchmarks are adjusted by the addition of LDPs and MLGs. Bushels marketed in the pre-harvest period according to the benchmark strategy are treated as forward contracts, with the LDPs assigned at harvest. Bushels marketed each day in the post-harvest period are awarded the LDP or MLG in existence for that particular day. Finally, just as in the case with comparable advisory program recommendations, it is assumed that all un-priced corn (but not soybeans) on May 31, 2005 is placed under loan. Interest opportunity costs are not charged to the benchmark after this date if the cash price for corn on the date of loan redemption is below the CCC loan rate.[42] Since market prices are substantially above the loan rate on May 31, 2005 for soybeans, it is assumed that un-priced soybean bushels are not placed under loan on this date for the 2004 crop.

[42] As with advisory programs, different procedures are used for computing interest opportunity costs on days when the cash price for corn is below the loan rate and *vice versa*. Refer to footnote 38 for specific details on the computations.

While the 24- and 20-month market benchmark prices can obviously differ for a given crop year, averages of the two benchmark prices across crop years are not expected to differ substantially. First, the difference in the marketing windows for the two benchmarks is relatively small, as the 20-month benchmark reduces the 24-month marketing window by only about 17%. Second, given a sufficiently large sample of crop years and efficient corn and soybean markets (cash, futures and options), the law of one price implies that annual averages of different average price benchmarks should be equal when stated on a harvest equivalent basis (Brorsen and Anderson, 1994). Of course, if corn and soybean markets are inefficient, the equivalence would not hold. In particular, if pre-harvest prices contain a "drought premium" as some argue (e.g., Wisner, Baldwin and Blue, 1998), then the 24-month benchmark price may be consistently higher or lower than the 20-month benchmark price, depending on the evolution of the drought premium.[43]

In contrast to averages, the variation of 24- and 20-month market benchmark prices across crop years is expected to differ. One reason for the difference is the well-known result in statistics that the sampling variation of the mean (average) is inversely related to the sample size used to compute the average (e.g., Griffiths, Hill and Judge, 1993, p.82). Since the sample of daily prices used in computing the 24-month benchmark is larger than the sample for the 20-month benchmark, the variation of the 24-month benchmark should be smaller than variation of the 20-month benchmark. Another reason is that the volatility of spot prices for storable commodities such as corn and soybeans increases as one moves from early in the 12-month marketing year (e.g., harvest) to later in the marketing year (Williams and Wright, 1991; Peterson and Tomek, 2005). The increase in volatility is driven by the decline in stocks that normally occurs during the marketing year. Specifically, available stocks are largest at harvest and then decline through the remainder of the marketing year, and consequently, a given demand shock will have the largest impact on price later in the marketing year. In terms of market benchmarks, this implies that the 20-month benchmark, which gives more weight to prices later in the marketing year, will be more volatile than the 24-month benchmark.[44]

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[43] It is typically argued that the drought premium is most pronounced during the spring months before harvest. If this is the case, then the 20-month benchmark price should, on average, exceed the 24-month benchmark price.

[44] If we assume the standard deviation of daily prices is constant over the entire 24-month window, an estimate of the sample size effect can be made. Specifically, the standard error of the sample mean (average) price is $\sigma/\sqrt{T}$, where σ is the standard deviation of daily prices and *T* is the sample size. For the 24-month market benchmark, the sample size is about 500 business days, whereas the sample size for the 20-month market benchmark is about 420 business days. Hence, for a given standard deviation of daily prices, σ, the standard errors will differ by a factor equal to $1/\sqrt{420} - 1/\sqrt{500}$, which implies the variation in the 20-month benchmark should be about nine percent larger than the variation in the 24-month benchmark. This difference is what should be observed over a large number of repeated random samples of prices generated in an efficient market with a constant daily standard deviation. The actual differences in the variation of the two benchmarks over 1995-2004 are larger, 24% for corn, 13% for soybeans and 11% for 50/50 revenue. As noted in the text, one reason for the larger differences is that the assumption of a constant daily standard deviation is not appropriate for corn and soybean prices. Other possible reasons include random effects in the relatively small sample of available crop years and violation of the underlying assumption market efficiency.

A practical concern with the market benchmarks is that a farmer may not be able to implement the benchmark strategies since they involve marketing a small portion of the crop every day. There are two reasons to believe this concern is not overly serious. First, a number of companies have developed and offer grain "index" contracts that allow farmers to receive the average market price over a pre-specified time interval. An extensive discussion of these new contracts can be found in the AgMAS research report by Hagedorn et al. (2003). Second, a strategy of routinely selling at less frequent intervals closely approximates the market benchmark prices. For example, a farmer might consider alternative "tracking" strategies of marketing only once a month or once every other month over the 24-month window.[45] Using mid-month prices, a tracking strategy of marketing only once a month (24 times) generates average prices over 1995-2004 that are quite close to 24-month market benchmark prices. The average difference is only two cents per bushel for corn and one cent per bushel soybeans, with a maximum difference for any particular crop year is eight cents per bushel in corn and five cents per bushel in soybeans. A tracking strategy of marketing once every other month (12 times) also generates average prices over 1995-2004 that are close to those of the 24-month market benchmark. The average difference is only two cents per bushel for corn and five cents per bushel for soybeans.

The average difference results for the benchmark tracking strategies should not be a surprise given the previous argument about averages of different benchmark prices in efficient markets. More surprising is the result that the variation of the tracking strategies across crop years for both commodities is only one to three cents per bushel (three to nine percent) more than the 24-month benchmark over 1995-2004. This is surprising because the tracking strategies are based on dramatically smaller samples, 12 or 24 observations compared to about 500 observations for the 24-month benchmark, but have only a marginally higher variation across crop years. The most likely explanation is that observations for the tracking strategies are not selected at random, but are instead equally spaced across the entire marketing window. Further research is needed to fully understand the behavior of tracking strategies in corn and soybean markets.

Farmer Benchmarks

As noted earlier, a farmer benchmark is designed to measure the average price received by farmers for a crop. This type of benchmark should reflect the actual behavior of farmers in marketing grain, and include all of the transactions (e.g., cash, forward, futures and options) that farmers employ in this regard. In addition, the farmer benchmark should be based on the pricing performance of farmers who do not follow the advisory programs tracked by the AgMAS Project. In theory, such a farmer benchmark should not be difficult to calculate. First, a representative sample of grain farmers in the relevant geographic area who do not follow the programs in the AgMAS Project would be drawn (randomly). Next, the average price received by each farmer would be computed (using the same assumptions as in the computation of net advisory prices and market benchmarks). Last, the farmer benchmark would be computed as the

[45] The "tracking" strategies terminology is adapted from the finance literature, where "tracking" errors arise as investment managers attempt to replicate the returns of a target benchmark portfolio (e.g., Roll, 1992; Frino and Gallagher, 2001).

weighted-average price received by all farmers in the sample, with the weights equal to the sample proportion of the crop produced by each farmer.

In practice, detailed data on farm-level marketing transactions for corn and soybeans in central Illinois are not available, so the "ideal" type of farmer benchmark discussed in the previous paragraph cannot be computed.[46] Instead, approximations must be used. The best available starting point is the USDA average price received series. In Illinois, this series is based on information collected in monthly mail and telephone surveys of about 200 grain dealers, processors and elevators that actively purchase grain from farmers (Harden, 2003). The survey is conducted by the Illinois Agricultural Statistics Service, the state office for the National Agricultural Statistics Service of the USDA.[47] Surveyed firms report total quantities and gross value for grain purchased directly from farmers (USDA/NASS, 2002). Total quantities are reported on a dry, or shrunk, basis at the standard moisture content for the commodity. Total gross value is the value of bushels purchased from farmers after deducting price discounts and adding premiums for quality factors and moisture content and adding premiums for direct delivery to mill, processor, river terminal or rail terminal. Check-off fees and charges for drying, cleaning, storing or grading are not deducted. The general principle used to determine the timing of transactions is the month when grain is purchased, that is, when cash changes hand between the firm and farmers. Hence, cash sales and forward contracts are reported for the month of delivery. Basis, minimum price, option and hedge-to-arrive contracts also are reported for the month of delivery. Alternatively, deferred payment and delayed pricing contracts are reported in the month when payment is received. The average price received estimate for a month is the total gross value across all surveyed firms divided by total quantities summed across all surveyed firms. This estimate may incorporate statistical adjustments that reflect size differences across reporting firms and other factors.

The USDA price received series has both strengths and weaknesses with respect to measuring the average price received by (unadvised) farmers. On the positive side, the USDA series reflects the actual pattern of cash grain marketing transactions by farmers, and thus, incorporates the marketing windows and timing strategies actually used by farmers; includes forward contract transactions for both the pre-harvest and post-harvest periods, with the transactions recorded at the forward price, not the spot price at the time of delivery; and grain sales are adjusted to industry standards for moisture. On the negative side, the USDA series is only available in the form of a state average; includes cash transactions for different grades and quality of grain sold by farmers; does not include futures and options trading profits/losses of farmers; reflects a mix of old and new crop sales by farmers; and is based on the pricing behavior of both unadvised and advised farmers.

Fortunately, none of the problems mentioned above appear to be prohibitive with respect to the use of the USDA series as a measure of the average price received by farmers. Consider

[46] See Anderson and Brorsen (2005) for an example of the construction of a farmer benchmark based on farm-level marketing transactions. Specifically, they construct farmer benchmarks for wheat in Oklahoma based on detailed transaction data on farm-level marketing at three elevators.

[47] The website for the Illinois Agricultural Statistics Service is http://www.agstats.state.il.us/website/welcome.htm.

first the state average nature of the series. It is straightforward to adjust the USDA series to an alternative geographic location, since spatial basis patterns are relatively stable. This type of adjustment turns out not to be necessary for AgMAS performance evaluations because central Illinois prices closely mirror the average price for the entire state of Illinois. Based on an analysis of weekly prices, the average cash price for central Illinois over January 1995 - December 2004 differs from the state average price by only about one-half cent and two cents, respectively, for corn and soybeans (state average lower for both corn and soybeans). The correlation of changes in weekly prices for central Illinois and the state is 0.97 for corn and 0.99 for soybeans. Hence, from a statistical standpoint, central Illinois and state average prices are nearly equivalent.

While it is not possible to adjust the USDA series to a constant grade and quality, to reflect futures and options trading profits/losses of farmers or to only reflect new crop sales, because the data simply are not available, the resulting biases probably are small and some may work in opposite directions. Examining the grade and quality issue first, it is well known that some fraction of the corn crop is discounted relative to the standard number two yellow corn grade. This is also true for the soybean crop relative to the standard number one yellow soybean grade, but likely to a smaller extent than corn. As a result, the USDA average price received reflects a weighted-average of both undiscounted and discounted grain sales. The weights are unknown, but the direction of the bias relative to average prices for the standard grade is clearly downward. In other words, when compared to the average price at the standard grade, the USDA average price received should be adjusted upwards to reflect the impact of discounts.

A key question, of course, is the magnitude of the grade and quality bias discussed above. An extensive search of the literature was conducted and no previous study was uncovered that directly measured the proportion of corn and soybeans sold at a discount or the average magnitude of price discounts in central Illinois (or other Midwestern U.S. areas). The Federal Grain Inspection Service of the U.S. Department of Agriculture (FGIS) was contacted and staff indicated that FGIS does not have an historical series of this type. One older study was located that contained some information on the issue. Hill, Kunda and Rehtmeyer (1983) reported the results of a 1982 survey of grain elevator operators in Illinois. One question in this survey asked elevator operators to estimate the percentage of corn and soybean receipts at country elevators that typically exceed grade factors. Unfortunately, the results were not netted across grade factors, so it is not possible to estimate the typical proportion of the crop sold at a discount (if a lot is over one grade limit it will have a higher than average chance of being over the grade limit for other factors). In addition, the average magnitude that grade factors were exceeded is not reported, so it is impossible to estimate the dollar value of the average discount. Nonetheless, the results provide some perspective on the quality issue. For corn delivered in the fall, the percentage typically above a grade factor ranged from 0.2 to 7.5% of deliveries. For soybeans delivered in the fall, the percentages were about the same, except for foreign material, where over 30% of the bushels delivered typically exceeded the grade factor. When winter and summer delivery was considered, the percentages increased somewhat for corn and decreased for soybeans. Other than foreign material for soybeans, this evidence suggests that less than 10% of the corn and soybean crops in the early 1980s were sold at a discount to the standard grade.

To provide more recent evidence on quality, the nine central Illinois elevators surveyed annually for commercial storage costs were queried in December 2001 about the average quality of corn and soybean crops. The most frequent response from the elevator managers in this informal survey was that less than one percent of corn and soybeans is sold at a discount relative to the standard grade. The range was from zero to less than five percent. The largest estimate of the average dollar value of discounts was two to three cents per bushel. These figures provide enough information to make a very rough estimate of maximum quality bias in the USDA average price received series. Using the maximum proportion of five percent and the maximum average discount value of three cents from the informal survey, the downward bias relative to the standard grade would be only 0.15¢ per bushel (0.05*3). Furthermore, if the average discount is three cents, then one-third of the crop would have to be sold at a discount to induce a downward bias even as large as one cent (0.33*3 = 1). In sum, while the evidence is limited and sketchy, it does suggest that any downward quality bias in the USDA average price received series, at least for corn and soybeans in central Illinois, is quite small.

Now, consider the potential bias from omission of futures and options profits/losses. If a farmer uses futures and options exclusively for "pure" hedging purposes, they will consistently take short positions at about the same points in the marketing window each year.[48] Unless futures prices are biased upwards or downwards, this type of hedging will not result in large profits or losses, as the hedge profits and losses from upward and downward price trends should roughly offset over time.[49] If a farmer uses futures and options to engage in "selective" hedging, they may have large profits or losses related to the timing of trading. Unfortunately, no direct evidence on the profits or losses of farmers is available in this context. Indirect evidence is provided in a study by McNew and Musser (2002), who examine data from a real-time forward pricing game employed by farmer marketing clubs in Maryland over 1994-1998. They find that forward pricing profits for all clubs, although statistically insignificant, averaged about 10¢ per bushel per year. The difficulty with this evidence is that it is difficult to know whether the experience in a game setting can be generalized to actual farmer behavior. The literature on who wins and loses in futures markets provides further indirect evidence on the question. Studies in this literature have long shown that small traders consistently lose money in futures markets (e.g., Stewart, 1949; Ross, 1975; Hartzmark, 1987). It seems reasonable to argue that farmers engaged in selective hedging are similar to other small traders, and hence, selective hedging by farmers in futures and options markets likely results in aggregate trading losses.[50] Given that, in aggregate, pure hedging is expected to yield zero profits on average and selective hedging is

[48] "Pure" hedging assumes that futures and options markets are efficient and that the only motivation for hedging is to minimize risk (e.g., McNew and Musser, 2002).

[49] The question of bias in futures prices has a long and contentious history in the economics literature. If a bias exists in corn and soybean futures prices, the available evidence suggests the magnitude is small from an economic perspective. This evidence generally is based on long samples of futures prices. Over short sample periods, futures prices can have sharp upward or downward trends. Probably the most dramatic example is the upward trend in grain futures prices between 1972 and 1975. See Zulauf and Irwin (1998) for a thorough discussion and additional references.

[50] The argument here is that selective hedging by farmers, in aggregate, results in trading losses. This does not preclude the possibility that some individual farmers consistently earn trading profits through selective hedging.

expected to yield losses on average, the net effect of the two types of futures and options trading by farmers should be negative. In this case, when compared to average prices at the standard grade, the USDA average price received should be adjusted downward to reflect the impact of net trading losses.

As before, the key question is the potential magnitude of the bias from omission of futures and options losses. The key piece of evidence in this regard is the limited scale of farmer trading in futures and options markets. Surveys have consistently reported that relatively few farmers directly use futures and options contracts on a regular basis (e.g., Patrick, Musser and Eckman, 1998). Given this information, it is reasonable to argue that the magnitude of farmers' net losses from futures and options trading, in aggregate, should be small. As a result, the upward bias in the USDA average price received from the omission of futures and options net losses should be small.

Next, consider the potential bias from mixing old crop and new crop sales during the 12-month marketing year used to compute the USDA average price received. The first step is to determine the potential magnitude of the problem. Fortunately, bounds for the "shifting" of old crop sales into the next marketing year can be computed by dividing ending stocks for a marketing year by crop production for the same marketing year (e.g., September 1, 2000 soybean stocks divided by 1999 soybean production). Over the 1995/1996 through 2004/2005 marketing years, on-farm ending stocks in Illinois averaged three percent of statewide corn production and two percent of statewide soybean production. These percentages are the lower bounds on shifting because farmers presumably own on-farm stocks and sales of these stocks will be shifted to the next marketing year. Over the 1995/1996 through 2004/2005 marketing years, total ending stocks (on-farm and off-farm) in Illinois averaged 12% of statewide corn production and 7% of statewide soybean production. These percentages are the upper bounds on shifting; assuming farmers own all of the stocks in off-farm storage facilities. Clearly, this assumption is unrealistic, as commercials own some, if not most, of the stocks in off-farm facilities at the end of a marketing year. The bottom-line is that shifting of old crop sales into the next marketing year, on average, is somewhere between 3 and 12% of corn production and 2 and 7% of soybean production. This suggests the magnitude of shifting from one crop year to the next probably is not large.

The second step is to determine the impact shifting old crop sales will have on the USDA average price received. Consider the simplest case where old crop sales in the next marketing year are made at spot prices for the new crop and the same proportion is shifted every year. The same price received would result as in the no shifting case. Only to the degree that the proportion shifted varies from year-to-year will the average price received differ from the no-shifting case. The proportion does vary from year-to-year, but not by a substantial amount. For example, on-farm ending stocks in Illinois varied from only two to six percent of corn production over the 1995/1996 through 2004/2005 marketing years. The impact of this variability on average price received will depend on farmers' ability to time shifts to take advantage of favorable spreads between old crop and new crop prices. If farmers as a group have timing ability in this context, then the USDA average price received will be biased upwards relative to the average price at the standard grade. However, given the difficulty of predicting old crop-new crop price spreads (Lence and Hayenga, 2001) and the small absolute magnitude of

actual shifting of sales, it seems reasonable to argue that the bias in average price received from shifting old crop sales across marketing years is quite small.

The last issue to consider is that the USDA average price received series reflects the pricing behavior of unadvised and advised farmers, where advised refers to the programs tracked by the AgMAS Project. As pointed out earlier, this means it may not be possible to "cleanly" disentangle the value of market advisory service information relative to the information used by farmers, as the USDA series already reflects the impact of market advisory program information to some degree. A national survey of advisory service subscribers by the AgMAS Project provides some perspective on the dimensions of this problem (Pennings et al., 2004). While only 11% of the survey respondents said they followed market advisory service recommendations closely, two-thirds indicated they followed the recommendations loosely. Further, when asked to rate the impact of advisory service recommendations on their marketing, subscribers gave an average rating of six on a nine-point scale, with a one indicating no impact at all and a nine indicating great impact. To the extent that farmers subscribe to market advisory services, these results suggest that the average price received by farmers for a crop is influenced by the marketing advice of advisory services.

This discussion suggests that a key unknown is the proportion of farmers that subscribe to advisory services. Unfortunately, this information is proprietary, so it is not possible to provide exact figures for the programs tracked by the AgMAS Project. Several studies have reported survey evidence on the use of advisory services, marketing newsletters and marketing consultants (defined generically), with estimates ranging widely from 21.1% of Illinois farmers (Norvell and Lattz, 1998) to 66% of farmers nationwide (Smith, 1989). It is uncertain what these estimates imply for the proportion of farmers that subscribe to the programs tracked by the AgMAS Project. On one hand, the programs tracked by the AgMAS Project are among the most popular and widely-followed. On the other hand, the same programs clearly are a subset of all advisory services, marketing newsletters and marketing consultants offered to farmers. While the available evidence is sketchy and uncertain, it nonetheless does suggest that a non-trivial proportion of central Illinois farmers likely subscribe to the advisory programs tracked by the AgMAS Project. It therefore can be reasonably concluded that the average price received by central Illinois farmers for corn and soybeans is impacted to some degree by the information provided by these same programs.

Another key unknown is the pricing performance of unadvised versus advised farmers. Patrick, Musser and Eckman (1998) survey large-scale Midwestern grain farmers and find that farmers using marketing consultants typically received higher prices than those that did not. While this evidence cannot be generalized to all farmers because of the skewed size distribution of farm operations in the sample, it does nevertheless seem to be a plausible outcome. Additional evidence is provided in a recent study by McBride and Johnson (2004). Data from the 2001 Agricultural Resource Management Survey (ARMS) survey, which is conducted by the USDA, was analyzed in this particular study. The focus was a sample of 1,149 cash grain farms throughout the U.S. Regression analysis revealed that the use of "farm management services" increased a modified measure of net farm income by $4,000 per operation. Furthermore, using a farm management service for market advice was one of only four management actions that had a statistically significant impact on farm financial performance after controlling for other

economic factors, farm structure and operator characteristics. The survey did not explicitly define a "farm management service," so it cannot be known with certainty whether respondents included agricultural market advisory services in their definition of the term.[51] However, it seems reasonable to assume that most respondents would have considered advisory services to be included in the definition based on the context of the question.[52] If this assumption is correct, the results of the study provide evidence, albeit indirect, that the financial performance of advisory service subscribers is enhanced compared to non-subscribers. However, in addition to the previous definitional issue, the results of McBride and Johnson's study do not disentangle whether the income enhancement is the result of improved information and analysis, improved input pricing performance, improved output pricing performance or some combination of the three.

Overall, the available evidence supports the view that advised farmers outperform unadvised farmers in terms of pricing crops. Combined with the evidence that a substantial proportion of central Illinois corn and soybean producers subscribe to advisory programs, a reasonable conclusion is that the USDA average price received series is biased upward relative to the price received by unadvised farmers. Regrettably, there is nothing that can be done about this problem without other sources of data on farmer pricing performance. The USDA average price received is probably best viewed as an estimate of the upper bound for the average price received by unadvised farmers.

Given the uncertainties involved in measuring the average price received by farmers, this study follows Irwin, Good and Martines-Filho (2006) and specifies two alternative farmer benchmark series. The first is based directly on the USDA average price received series and has been used in earlier annual AgMAS performance studies (e.g., Irwin et al., 2005). To begin, mid-month commercial storage charges are applied to the USDA average price received for Illinois in each month of the 12-month marketing year (September through August). Next, the annual weighted-average price received is computed using USDA marketing weights for the percentage of the crop marketed each calendar month in Illinois. Last, actual state average marketing loan benefits are added for the 1998-2004 crops.[53] In order to compare this

[51] The exact wording of the question in the 2001 ARMS survey was, "Did you use farm management services for advice on input or commodity markets?" Neither the enumerator's manual nor training provided a specific definition of a farm management service, so the definition was subject to the respondent's interpretation (McBride, 2005).

[52] One of the study's authors (McBride, 2005) noted that the intention in asking this question was to find out whether or not farm operators sought and purchased professional advice from a service provider about input cost control or commodity marketing. Since market advisory services provide professional advice for fee, it is safe to conclude that the authors intended the definition of a farm management service to include advisory services.

[53] State average LDPs and MLG's for Illinois were collected from on-line Farm Service Agency reports at: http://www.fsa.usda.gov/dafp/psd/reports.htm. Beginning with the 2004 crop year, the "effective" LDP/MLG rate is used for both corn and soybeans. The effective rate is computed as the weighted-average LDP/MLG rate for a crop year times the proportion of farmers that receive marketing loan benefits. For example, the weighted-average 2004 LDP/MLG rate for soybeans in Illinois is 23¢ per bushel. This is multiplied by 0.49, the proportion of farmers receiving benefits, to arrive at an effective rate of 11¢ per bushel. In previous crop years, the proportion of farmers

benchmark to the market benchmarks and net advisory prices it must be assumed that the net systematic bias in the USDA average price received series due to spatial, quality, old/new crop factors and the mixing of advised and unadvised farmers is negligible. The evidence and arguments discussed above suggest that the net systematic bias in the USDA average price received due to spatial, quality, futures/options and old/new crop factors is small, at least for corn and soybeans in central Illinois. It is difficult to construct a scenario where the overall level of bias from these factors would materially effect performance evaluation of market advisory programs. A more difficult problem is presented by the mixture of unadvised and advised farmers that the USDA average price received reflects. This "mixing" likely biases the USDA price received series upward relative to the price received by unadvised farmers. Given the limited evidence on the extent that central Illinois farmers use the programs tracked by the AgMAS Project and the precise impact of their recommendations, it is difficult to assess the magnitude of the bias. As noted earlier, a beneficial feature of this benchmark is that the USDA average price received series reflects both spot and forward market transactions.

The second farmer benchmark uses central Illinois cash market prices for the 12-month marketing year and USDA marketing weights. This version was first proposed by Irwin, Good and Martines-Filho (2006) and has not been used in previous annual AgMAS performance studies. Here, cash market prices, net of storage costs, are averaged for each month of the 12-month marketing year. This has the advantage of eliminating any bias due to spatial, quality, old/new crop factors and the mixing of advised and unadvised farmers. Next, the annual weighted-average price received is computed by applying the USDA marketing weights to the monthly average cash prices (net of storage costs). As the last step, the same state average marketing loan benefits added to first farmer benchmark are added to this alternative version for the 1998-2004 crops. This benchmark is directly comparable to the market benchmarks and net advisory prices because the same cash market prices are used in all series. A disadvantage of this specification is that the cash prices used to construct the benchmark only reflect spot market transactions. There is ample survey evidence that many farmers use pre-harvest forward contracts to price a portion of their crops, and that post-harvest forward contracts are commonly used, particularly for January delivery (e.g., Patrick, Musser and Eckman, 1998; Coble et al., 1999; Isengildina et al., 2004). In addition, this alternative also does not reflect futures and options profits/losses of farmers.

Finally, it is interesting to consider arguments about the expected difference in averages and variation between the farmer benchmarks and the market benchmarks. If corn and soybean markets are efficient and farmers are rational, then the average price across crop years for the farmer and market benchmarks should be similar. Under these assumptions, the variation in farmer benchmark prices across crop years could be smaller or larger than the variation in market benchmark prices, depending on the length of the marketing window used by farmers and the exact nature of the marketing strategies implemented by farmers.

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receiving benefits was rounded to either zero or one to determine the final LDP/MLG payment added to farmer benchmarks.

Unfortunately, it is not possible to determine the average marketing window or the pricing pattern of farmers using USDA monthly marketing weights. For perspective, average monthly USDA marketing weights for corn and soybeans in Illinois over 1995-2004 are presented in Figure 10. These weights reflect the pattern of grain purchases by commercial facilities from farmers over the 12-month marketing year. Grain purchases, as defined by the USDA, do not necessarily reflect the pricing pattern of farmers due to the use of forward pricing instruments. As noted above, there is considerable evidence that many farmers use pre- and post-harvest forward contracts to price a portion of their crops. However, the evidence on the magnitude of forward contracting by farmers is more limited.

Three studies provide the best evidence that is available on the magnitude of forward contracting, as a large number of farmers are randomly sampled in each study. The first, by Coble et al. (1999), surveyed farmers in four states a number of questions regarding risk management, including the percent of crop production in 1998 priced before harvest. Based on the responses reported in the study, it can be estimated that farmers in Indiana and Nebraska (the closest states to Illinois) priced 15.7% of corn and 14.0% of soybean production pre-harvest. The second study, by Katchova and Miranda (2004), used data reported in the 1999 ARMS survey by the USDA. Farmers in this survey were asked about their use of marketing contracts for the 1999 crop. The definition of marketing contracts included forward contracts, futures and options contracts, formula pricing contracts, delayed price contracts, minimum price contracts, fixed basis contracts, futures fixed contracts, and other contracts. Based on the information reported in Katchova and Miranda's study, it can be estimated that farmers in the U.S. priced 5.0% of corn and 5.2% of soybean production in 1999 using marketing contracts. The third study also used data from the USDA ARMS survey (USDA/NASS, 2003). In this case, respondents to the annual ARMS survey were asked about their use of marketing contracts for the 2001 crop. It was reported that farmers in the Corn Belt region (Illinois, Indiana, Iowa, Missouri and Ohio) marketed 10.1% of corn and 9.0% of soybeans through marketing contracts. The estimates from the three studies suggest that the magnitude of forward pricing is modest, but nonetheless, large enough to make the USDA monthly marketing weights potentially misleading indicators of the true pricing pattern of farmers. It is also important to emphasize that the estimates discussed here pertain to only three crop years and there may be considerable variation in the magnitude of forward pricing across other crop years. For example, Coble et al. (1999) also asked farmers how much of their 1999 production they expected to price before harvest. The responses indicate that farmers in Indiana and Nebraska expected to price an average of 26.9% of corn and 23.1% of soybeans pre-harvest in 1999.[54]

A further difficulty is that almost no concrete evidence exists on the exact length of the typical marketing window of farmers. The two studies discussed above only investigated the magnitude of forward pricing, not the timing of such decisions. Without evidence to the contrary, it seems reasonable to argue that many farmers use a marketing window not unlike the 24-month and 20-month windows assumed for the market benchmarks, but the amount of pre-

[54] While dated, Paul, Heifner and Helmuth (1976) report survey estimates of forward contract usage that vary sharply across crop years.

harvest forward pricing is far less than is assumed for the market benchmarks. The two surveys suggest that pre-harvest forward pricing by farmers typically is in the range of 10 to 20%, compared to an average of 51 and 42% for 24-month and 20-month benchmarks, respectively, over 1995-2004. All else equal, this would lead to the expectation that the variation of farmer benchmark prices would exceed that for the market benchmarks.

Under rationality, it is still possible for the variation of farmer benchmark prices to be smaller than for market benchmarks if farmers employ market-timing strategies that successfully reduce price variation. Alternatively, if farmers are subject to the same judgment and decision biases as appears to be the case for participants in other markets, then it would be reasonable to expect the farmer benchmark to have a lower average price and higher variation than the market benchmarks. Which of the above scenarios is correct can only be determined empirically.

Net Advisory Prices, Revenues and Benchmarks for 2004

Net advisory prices, revenues and benchmarks for the 2004 corn and soybean crops are presented in Tables 9 through 14. These results are new and add to the sample of net advisory prices and benchmarks previously available for analysis. For a specific example of how marketing recommendations are translated into a final net advisory price that incorporates the simulation assumptions, see Jackson, Irwin and Good (1996). It is important to emphasize that all of the net advisory prices, revenues and benchmarks presented in Tables 9 through 14 are stated on a harvest equivalent basis using either on-farm variable or commercial storage costs.

Net advisory prices and benchmarks for corn in 2004 assuming on-farm variable storage costs are presented in Table 9. In addition, this table shows the components of the advisory prices and benchmarks. The 2004 average net advisory price for all 27 corn programs is $2.40 per bushel under the assumption of on-farm variable costs. It is computed as the unadjusted cash sales price ($2.18 per bushel) minus storage charges ($0.11 per bushel) plus futures and options gain ($0.10 per bushel) minus brokerage costs ($0.03 per bushel) plus LDP/MLG gain ($0.25 per bushel).[55] The range of net advisory prices for corn in 2004 assuming on-farm variable storage costs is $2.11 to $2.87 per bushel. Corresponding benchmark prices range from $2.06 per bushel (farmer benchmark with market prices) to $2.29 per bushel (farmer benchmark with USDA prices).

Net advisory prices and benchmarks for soybeans in 2004 assuming on-farm variable storage costs are presented in Table 10. The 2004 average net advisory price for all 26 soybean programs is $6.13 per bushel under the assumption of on-farm variable costs. It is computed as the unadjusted cash sales price ($5.98 per bushel) minus storage charges ($0.10 per bushel) plus futures and options gain ($0.18 per bushel) minus brokerage costs ($0.03 per bushel) plus LDP/MLG gain ($0.10 per bushel). The range of net advisory prices for soybeans in 2004 assuming on-farm variable storage costs is $5.58 to $7.49 per bushel. Corresponding benchmark

[55] Please note that components of average net advisory prices or revenues presented in the text may not exactly equal components implied in Tables 9 through 14 due to rounding.

prices range from $5.57 per bushel (farmer benchmark with market prices) to $6.02 per bushel (20-month market benchmark).

Since many Corn Belt farmers 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 farmer who follows both the corn and soybean marketing advice of a given program. It is assumed that the representative farmer splits acreage equally (50/50) between corn and soybeans and achieves corn and soybean yields equal to the actual yield for the area in 2004. The 50/50 advisory revenues are computed on a per acre basis and compared with the revenue a central Illinois farmer could have received based on benchmark prices for both corn and soybeans. Advisory revenue per acre is calculated only for those programs that offer both corn and soybean marketing advice.

Advisory program revenues and benchmarks in 2004 assuming on-farm variable storage costs are presented in Table 11. The average revenue achieved by following both the corn and soybean programs offered by an advisory program is $389 per acre. The range of 50/50 advisory revenue in 2004 assuming on-farm variable storage costs is $357 to $457 per acre. Corresponding benchmark revenues range from $342 per acre (farmer benchmark with market prices) to $371 per acre (24-month average market benchmark).

For comparison purposes, the annual subscription cost of each advisory program also is listed in the last column of Table 11. Subscription costs average $399 per program in 2004, levels that do not appear to be large relative to total farm revenue, whether a large or small farm is considered. Subscription costs average only 20¢ per acre for a 2,000 acre farm and 80¢ per acre for a 500 acre farm.

Net advisory prices and benchmarks for corn in 2004 assuming commercial storage costs are presented in Table 12. The 2004 average net advisory price for all 27 corn programs is $2.30 per bushel under the assumption of commercial storage costs. It is computed as the unadjusted cash sales price ($2.18 per bushel) minus storage charges ($0.20 per bushel) plus futures and options gain ($0.10 per bushel) minus brokerage costs ($0.03 per bushel) plus LDP/MLG gain ($0.25 per bushel). The range of net advisory prices for corn in 2004 assuming commercial storage costs is $1.96 to $2.70 per bushel. Corresponding benchmark prices range from $1.95 per bushel (farmer benchmark with market prices) to $2.19 per bushel (24-month average market benchmark).

Net advisory prices and benchmarks for soybeans in 2004 assuming commercial storage costs are presented in Table 13. The 2004 average net advisory price for all 26 soybean programs is $6.07 per bushel under the assumption of commercial storage costs. It is computed as the unadjusted cash sales price ($5.98 per bushel) minus storage charges ($0.16 per bushel) plus futures and options gain ($0.18 per bushel) minus brokerage costs ($0.03 per bushel) plus LDP/MLG gain ($0.10 per bushel). The range of net advisory prices for soybeans in 2004 assuming commercial storage costs is $5.53 to $7.45 per bushel. Corresponding benchmark prices range from $5.49 per bushel (farmer benchmark with market prices) to $5.95 per bushel (20-month average market benchmark).

Advisory program revenues and benchmarks in 2004 assuming commercial storage costs are presented in Table 14. The average revenue achieved by following both the corn and soybean programs offered by an advisory program is $377 per acre when commercial storage costs are assumed. The range of 50/50 advisory revenue in 2004 assuming commercial storage costs is $345 to $448 per acre. Corresponding benchmark revenues range from $329 per acre (farmer benchmark with market prices) to $363 per acre (24-month average market benchmark).

Figures 11 through 14 present the 24-month price pattern for corn and soybeans in central Illinois for the 2004 crop year based on on-farm variable and commercial storage costs, respectively. The top chart shows daily cash prices from September 2, 2003 through August 31, 2005. The pre-harvest prices are the cash forward contract prices for harvest delivery. The middle chart is a repeat of the top chart with daily LDP or 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 post-harvest daily cash prices are adjusted for cumulative storage costs (interest, physical storage and shrinkage charges). The chart illustrates the pattern of harvest equivalent prices plus LDP or MLG.

Net Advisory Prices, Revenues and Benchmarks for 1995-2004

Net advisory prices, revenues and benchmarks for the 2000-2004 crop years, assuming on-farm variable storage costs, are reported in Tables 15 through 17. Results are not presented for earlier crop years because the AgMAS Project first computed net advisory prices and benchmarks under on-farm variable storage costs for the 2000 crop year. Net advisory prices, revenues and benchmarks for the 1995-2004 crop years, assuming commercial storage costs, are reported in Tables 18 through 20.[56] In order to focus on a consistent set of net advisory prices and benchmarks for the entire sample period, the following discussion is based on net advisory prices, revenues and benchmarks with commercial storage costs. Finally, two sets of graphs are provided for additional perspective. Figure 15 presents the scatter of advisory prices or revenues for individual programs in each crop year over 1995-2004 (assuming commercial storage costs). Figures 16 through 18 compare average net advisory prices or revenue to the four alternative benchmarks over 1995-2004.

Table 18 shows the average advisory price for corn ranges between $1.99 per bushel in 2001 and $3.03 per bushel in 1995 (based on commercial storage costs). Range statistics reveal that net advisory prices for corn vary substantially within individual crop years. The most dramatic example is 1995, where the minimum is $2.29 per bushel and the maximum is $3.90 per bushel. Even in years with less market price volatility, it is not unusual for the range of prices across advisory programs to be near a dollar per bushel. The four alternative benchmark prices for corn are shown at the bottom of Table 18. The variation in benchmark prices from year-to-year is similar to that of average net advisory prices. However, there are substantial differences in benchmark prices for a particular crop year. For example, the 24-month market

[56] Some of the net advisory prices and revenues presented in Tables 18 through 20 for the 1995-2003 crop years are slightly different than the figures presented in earlier AgMAS pricing reports. Changes reflect the imposition of consistent rounding assumptions for all crop years.

benchmark in 1998 is $2.24 per bushel, while the farmer benchmark using market prices is only $1.92 per bushel.

As reported in Table 19, the average advisory price for soybeans ranged from $5.24 per bushel in 2002 to $7.27 per bushel in 1996 (based on commercial storage costs). Similar to corn, the range of individual net advisory prices within a crop year is substantial. The most dramatic example is 2003, where the range in advisory prices is just under $4 per bushel. The four alternative benchmark prices for soybeans are shown at the bottom of Table 19. The variation in soybean benchmark prices from year-to-year is similar to that of average net advisory prices. Once again, there are substantial differences in benchmark prices for a particular crop year.

Table 20 contains the combined corn and soybeans revenue results (based on commercial storage costs). The lowest average advisory revenue, $287 per acre, occurred in 2001, while the highest average advisory revenue, $377 per acre, occurred in 2004. Given the results for corn and soybeans, the large range of individual advisory revenues within a crop year is not surprising. Nonetheless, it is startling to see the possible economic impact of following the best versus the worst performer in a given crop year. For example, in four of the ten crop years (1995, 1999, 2000 and 2004) the range in advisory revenue exceeds $100 per acre.

For the reader's convenience, Tables 21 through 23 report the most recent two-year averages (2003-2004), three-year averages (2002-2004), four-year averages (2001-2004), five-year averages (2000-2004), six-year averages (1999-2004), seven-year averages (1998-2004), eight-year averages (1997-2004), nine-year averages (1996-2004) and ten-year averages (1995-2004) of net advisory prices, revenues and benchmarks (based on commercial storage costs).[57] The averages are computed in these tables only for the advisory programs active in each of the indicated crop years. Note that the average, minimum and maximum reported for each column in Tables 21 through 23 are computed across the advisory program averages in each column.

Information on the sources of the differences between net advisory prices and benchmarks in corn and soybeans is found in Table 24. Panel A shows average net advisory prices and benchmarks broken out by component. Panel B presents the average difference in the components between advisory programs and the benchmarks. All of the averages in the table assume commercial storage costs. In corn, the average net advisory price is above the average price for all four benchmarks. The difference is primarily explained by a higher unadjusted cash sales price and larger marketing loan benefits for advisory programs versus market benchmarks or higher unadjusted cash sales prices and lower storage costs for advisory programs versus farmer benchmarks. The net result of futures and options positions for advisory programs in corn is zero after brokerage costs. In soybeans, the average net advisory price also is above the average price for all four benchmarks. The difference is explained by a combination of higher unadjusted cash sales prices and larger marketing loan benefits for advisory programs versus market benchmarks and lower storage costs for advisory programs versus farmer benchmarks.

[57] Terms like "two-year average" are used to refer to averages of net advisory prices over multiple crop years.

The net result of futures and options positions for advisory programs in soybeans is plus two cents per bushel after brokerage costs.

In the earlier "Data Collection" section, the potential for survivorship bias in performance results was discussed. The most direct form of survivorship bias occurs when only advisory programs that remain in business at the end of a given sample period are included in the sample. While the performance indicators presented in the next section are not subject to this form of survivorship bias, as all programs that have been tracked over 1995-2004 are incorporated in the indicators, it is nonetheless interesting to consider the potential magnitude of survivorship bias when evaluating advisory program performance. A measure of survivorship bias can be computed based on the information found in Tables 21 through 23. The first step is to compute multiple-year averages across programs for each of the averaging periods found in Tables 21 through 23. These averages are reported in Table 25 as "survivor averages" because advisory programs must "survive" for the complete averaging period to be included in the computation. The second step is to compute multiple-year averages across all programs reported in Tables 21 through 23. These averages are reported in Table 25 as "grand averages" because all advisory programs active in the averaging period are included in the computation, whether they "survived" the entire period or not. The measure of survivorship bias for each averaging period is simply the difference between the survivor and grand averages. A positive (negative) difference means the survivor average is higher (lower) than the grand average and vice versa. As expected, nearly all of the differences are positive, indicating an upward bias in performance if only surviving programs are examined. The surprising result is the small magnitude of the differences, which vary between 1 and 3¢ per bushel for corn, -1 and 4¢ per bushel for soybeans and 0 and $3 per acre for advisory revenue. Especially noteworthy are the differences for the 1995-2004 ten-year averages, which are only 1¢ per bushel for corn, 0¢ per bushel for soybeans and $0 per acre for advisory revenue. The comparisons suggest survivorship bias is small or non-existent for the set of advisory programs considered in this study. The reason is found in Table 1, which presents the complete list of all programs included in the sample at some point over the 1995-2004 crop years. The notes in the last column of Table 1 indicate that programs were removed from the sample for a variety of reasons, including but not limited to poor performance. This lessens the survivorship impact of programs that exited due to poor performance.

Performance Evaluation Results for 1995-2004

Five quantitative indicators of performance are applied to advisory program prices and revenues over 1995-2004. The first indicator is the proportion of advisory programs in the top-, middle- and bottom third of the price range. This indicator measures performance relative to the range of pricing opportunities available during each crop year. The second indicator is the proportion of advisory programs that beat benchmark prices. This indicator measures directional performance, or in other words, whether performance is above or below a benchmark price (or revenue). A useful feature of this indicator is that it is not overly influenced by extremely high or low advisory prices. The third indicator is the average price (or revenue) of advisory programs relative to benchmarks. This indicator also measures performance relative to benchmarks, but it takes into account both the direction and magnitude of differences from benchmark prices (or revenues). The fourth indicator is the average price (or revenue) and risk

of advisory programs relative to benchmarks. This indicator takes into account the tradeoff between risk and return in performance comparisons. The fifth indicator is the predictability of advisory program performance from year-to-year. This indicator provides information on the value of past pricing performance in predicting future performance.

Before considering the performance evaluation results, two important issues need to be discussed. First, the results presented in this section of the report address the performance of market advisory programs *as a group*. In other words, average pricing performance across all programs is considered. This is a different issue than the pricing performance of a particular advisory program.[58] Simply put, it is inappropriate to make performance inferences for an individual advisory program based on aggregate results. Second, farmers subscribe to market advisory programs for a variety of reasons. For example, marketing information and market analysis are the two highest rated uses of market advisory programs by farmer-subscribers (Pennings et al., 2004). While the quality of marketing information and market analysis is likely to be positively correlated with the returns to marketing recommendations, this does not necessarily have to be the case. It is possible that advisory programs provide valuable information and analysis to farmer-subscribers, yet fail to exhibit superior pricing performance.

Price Range Performance

The first indicator of pricing performance is the proportion of advisory programs in the top-, middle- and bottom third of the price range. This indicator measures performance relative to the range of pricing opportunities available during each crop year. As noted in the introduction to this report, a commonly held and oft-repeated conception of farm marketing performance is that most farmers sell the bulk of their crop in the bottom-third of the price range. Given the widespread attention given to this measure of performance, it is a useful place to begin examination of the pricing performance of market advisory services.

The typical approach to defining the top-, middle- and bottom-third of the price range is illustrated by the left "box" in Figure 19.[59] Labeled as "Conventional," price ranges in this formulation are computed by simply dividing the range between the high and low prices for the 12-month marketing year (September-August) into thirds. Using the 2003 crop year for soybeans as an example, the marketing year high is $10.41 per bushel and the low is $5.64 per bushel. The top-, middle- and bottom-third of the price range are computed by dividing the overall range of prices ($10.41 - $5.64 = $4.77) into three approximately equal parts. While this method is simple to compute, it has several drawbacks. First, only spot market prices for the 12-month marketing year are considered, and hence, forward contracting opportunities before harvest are not considered. Second, post-harvest spot prices are not adjusted for physical storage

[58] For example, one possibility is that advisory programs as a group fail to beat market benchmarks, yet at the same time some programs have "exceptional" performance. Testing whether performance is exceptional for a particular advisory program requires different statistical tests than the ones used here (Marcus, 1990).

[59] Division of the price range into thirds is not motivated by theoretical considerations. The price range could just as easily be divided into quarters or deciles. Thirds are examined here because this is the division used most often in practice.

and interest opportunity costs, and hence, all spot prices in the 12-month marketing year are implicitly assumed to be equivalent regardless of timing. Third, computed price ranges are assumed to be approximately equal. It is well-known that commodity price distributions are highly skewed to the right (e.g., Williams and Wright, 1991). In other words, commodity price movements tend to be "spiky," which implies that large price moves occasionally occur but they do not persist for a long period of time. The implication is that the conventional approach may misrepresent the amount of time that market price spends in different price ranges, and from a practical standpoint, misrepresent the chance that a producer could take advantage of pricing opportunities.

A superior approach to defining the top-, middle- and bottom-third of the price range is illustrated by the right "box" in Figure 19. Labeled as "Alternative," this approach uses the entire 24-month marketing window to represent pricing opportunities. In addition, post-harvest prices are adjusted for commercial storage costs and price ranges are time-weighted. Again using the 2003 crop year for soybeans as an example, the first step is to sort all of the daily pre-harvest, harvest and post-harvest prices for the 24-month marketing window (September 2002 - August 2004) from high to low. All post-harvest prices are adjusted for commercial storage costs (interest and physical storage). Note that prices and storage costs are exactly the same as those used to construct the 24-month market benchmark for the 2003 crop year. The second step is to compute percentiles of the daily price distribution. The third step is to determine the bottom, middle-, and top-third of the price range based on the 0, 33rd, 66th and 100th percentiles of the daily price distribution. As illustrated in Figure 19, this alternative method can yield price ranges that differ markedly from the conventional approach. For example, the top-third of the price range under the conventional approach is $8.82 to $10.41 per bushel compared to $7.28 to $10.05 per bushel under the alternative approach. When interpreting price ranges from the alternative approach it is helpful to remember that the ranges reflect an equal number of days over the 24-month marketing window. Hence, the market spent approximately one-third of the time over September 2002 - August 2004 in each of the three price ranges. However, the price range during the bottom one-third of the days was only $4.74 to $5.09 per bushel, while the price range during the top one-third of the days was much larger at $7.28 to $10.05 per bushel.

The alternative approach to computing price ranges is applied to each crop year over 1995-2004 for both corn and soybeans. In order to test the sensitivity of performance results to the definition of the marketing window, price ranges are computed for both 24- and 20-month marketing windows. The windows, prices and storage costs are exactly the same as those used in constructing the 24- and 20-month market benchmarks. Note that marketing loan benefits are not added to prices for the 1998-2004 crop years because the payments could affect the distribution of prices in those years.

Net advisory prices (minus marketing loan benefits) are plotted in Figure 20 along with boxes representing 24-month price ranges for each crop year over 1995-2004. The top panel shows the results for corn and the bottom panel shows the results for soybeans. The changing relative proportions in the boxes illustrate the varied nature of pricing opportunities through time. In crop years with sharp upward price movements (1995 corn, 2003 soybeans) the top one-third of the price range is many times larger than the bottom one-third. Just the opposite pattern tends to be observed in years with large price declines (1997 corn and soybeans). Both panels

show the interesting result that net advisory prices in a given crop year can be above the highest single day price or below the lowest single day price. As an example, the lowest single price for the 2003 crop year in soybeans is $4.74 per bushel (after adjusting for commercial storage costs) and the lowest net advisory price is $3.69 per bushel. The reason that advisory prices can be "out of the box" is simply due to gains and losses on futures and options positions.

The frequency of net advisory prices (minus marketing loan benefits) falling in the top-, middle- and bottom-third of price range over 1995-2004 is presented in Table 26. Considering corn first (Panel A: Table 26), there is substantial variation in the frequencies across marketing years for either the 24- or 20-month marketing window. For example, the frequency in the top-third of the price range for the 24-month marketing window in corn varies between 0 and 50%. The frequency in the bottom-third of the price range for the 24-month marketing window has a similar range, between 0 and 44%. Despite the variation across crop years, there does not appear to be any discernable trend in the proportions for either benchmark over the 10 crop years. Some sensitivity is observed in the results for a given crop year across the two marketing windows, particularly for the top-third of the price range. As an example, the proportion for the top-third of the price range in 2000 is 4% with the 24-month marketing window and 52% with the 20-month window. Nevertheless, the 1995-2004 averages for each price range are fairly close across the two marketing window definitions. On average, the results show that the chance of advisory programs pricing in the top-third of the price range is modest, between 17 and 25% in corn.[60] By far the largest average frequency occurs in the middle third of the price range, ranging from 58 to 63%. The average frequency of advisory program performance falling in the bottom-third of the price range, between 17 and 20%, is similar to the average frequency of falling in the top-third.

Price range results for soybeans (Panel B: Table 26) are similar to the results for corn. There is a large variation in the frequencies across marketing years for the 24- and 20-month marketing windows but there is no obvious trend in the proportions over time. Results for a given crop year again vary across the two marketing windows, particularly for the top-third of the price range. As an example, the proportion for the top-third of the price range in 1996 is 38% with the 24-month marketing window and 13% with the 20-month window. Like corn, the 1995-2004 averages for each price range are fairly close across the two marketing window definitions. On average, the results show that the chance of advisory programs pricing in the top-third of the price range is modest, between 17 and 19% in soybeans. The largest average frequency occurs in the middle third of the price range, ranging from 67 to 69%. The average

[60] Note that the average proportions reported in Table 26 for 1995-2004 are computed over the full set of advisory programs, and therefore, do not necessarily equal the average of the individual crop year proportions. The "grand" averages equally weight each of the advisory programs in the sample, whereas the average of the individual crop year averages equally weights the crop years. The grand average is preferred for the present purpose as it implies an equal probability of selecting an individual advisory program across the entire sample. The different forms of averaging will produce equal estimates only for a "balanced" time-series cross-section data set. That is, the number of programs must be the same for each crop year and there are no missing observations. This clearly is not the case here. It turns out, however, that two methods of averaging produce estimates of the average proportion within plus or minus one percentage point. Finally, note that the grand average proportions in Table 26 are computed in a similar manner to the grand average prices or differences from benchmarks reported in Table 24.

frequency of advisory program performance falling in the bottom-third of the price range varies between 12 and 16%.

The price range performance results can be difficult to interpret because theory does not provide an external benchmark, as is the case with the other four performance indicators. For example, theory does not help determine whether the 17% chance of advisory programs falling in the top-third of the 24-month price range in corn is "high" or "low." The only alternative is to compare advisory program performance to other groups. Farmers are an obvious target for comparison. Frequencies for the farmer benchmarks developed in this study are therefore computed over 1995-2004. The frequency of farmer benchmark prices (minus marketing loan benefits) falling in the top-third of the price range over 1995-2004 averages 10% in corn and 18% in soybeans across all four possible comparisons (24- and 20-month marketing windows and two versions of the farmer benchmark).[61] The average frequency in corn is somewhat lower than that of advisory programs (21%) but the same as in soybeans (18%). Longer-term evidence on this question is provided by Hagedorn et al. (2005), who estimate frequencies of farmer benchmark prices for corn and soybeans falling in the top-, middle- and bottom-third of the price range over 1973-2003 using nearly identical methods as the present study. They report that the frequency of farmer benchmark prices (minus marketing loan benefits) falling in the top-third of the price range over 1973-2003 averages 15% in corn and 22% in soybeans across four comparisons (24- and 20-month marketing windows and the same two versions of the farmer benchmark). These frequencies differ only marginally from those of market advisory programs over 1995-2004. Caution obviously should be used in making comparisons across the two studies because of the large difference in sample periods. Nonetheless, the weight of the evidence suggests that the average performance of market advisory programs relative to the pricing opportunities provided by the market is modest at best.

Directional Performance

The second indicator of pricing performance is the proportion of advisory programs that beat the market or farmer benchmarks. This indicator measures directional performance, or in other words, whether performance is above or below a benchmark price (or revenue). Positive performance is indicated if the proportion of advisory programs beating a benchmark exceeds 50%, the proportion one would observe if advisory performance is random, like flipping a fair coin. A useful feature of this indicator is that it is not overly influenced by extremely high or low advisory prices.

[61] The frequency of farmer benchmark prices (minus marketing loan benefits) falling in the middle-third of the price range over 1995-2004 averages 53% in corn and 63% in soybeans across all four possible comparisons. The frequency of farmer benchmark prices falling in the bottom-third of the price range over 1995-2004 averages 38% in corn and 20% in soybeans across all four possible comparisons. The complete set of frequencies for the farmer benchmarks in corn and soybeans is available from the authors upon request.

The proportion of advisory programs in corn, soybeans and 50/50 advisory revenue above the benchmarks over 1995-2004 is presented in Table 27.[62] Considering corn first (Panel A: Table 27), there is some variation in the proportion of net advisory prices above the two market benchmarks for individual crop years, particularly 1998, but the patterns are similar overall. There also does not appear to be any discernable trend in the proportions for either benchmark over the 10 crop years. The average proportion for 1995-2004 is 52% versus the 24-month benchmark and 62% versus the 20-month benchmark, indicating a small to marginal chance of advisory prices in corn beating market benchmark prices. In contrast, the proportion of net advisory prices above the farmer benchmark equals or exceeds 50% in all but two cases (1995 and 2003 for the farmer benchmark with market prices). The average proportion for 1995-2004 is 69% versus the farmer benchmark with USDA prices and 71% for the farmer benchmark with market prices, indicating a better than average chance of advisory prices in corn beating farmer benchmark prices. Finally, the proportions appear relatively stable for all four benchmarks, as there is not an obvious up or down trend in any of the proportions over time.

Moving to soybeans (Panel B: Table 27), there is more variation in the proportion of net advisory prices above the two market benchmarks for individual crop years. Particularly sharp differences are observed in 1998 and 1999, where the spread between proportions for the two market benchmarks is 45 and 36 percentage points, respectively. Despite these differences for individual crop years, the average proportions for 1995-2004, 65% versus the 24-month benchmark and 71% versus the 20-month benchmark, both indicate a better than average chance of advisory prices beating market benchmark prices in soybeans. There is less variation across the two farmer benchmarks in individual crop years, but the average proportions over 1995-2004 are smaller, 58% versus the farmer benchmark with USDA prices and 63 percent versus the farmer benchmark with market prices. This indicates a marginal chance of market advisory programs generating net prices in soybeans higher than farmer benchmarks. Once again, the proportions appear relatively stable over time for all four benchmarks.

Given the combined nature of 50/50 advisory revenue, it is not surprising that revenue proportions (Panel C: Table 27) typically are between those of corn and soybeans.[63] The average proportion is 59% versus the 24-month benchmark over 1995-2004 and 68% versus the 20-month benchmark, indicating a marginal to better than average chance of advisory revenue beating market benchmark revenue. The average proportion is 64% versus the farmer benchmark with USDA prices over 1995-2004 and 67% versus the farmer benchmark with market prices. These indicate a moderate chance of advisory revenue beating farmer benchmark revenue.

[62] Once again, proportion averages for 1995-2004 are computed over the full set of advisory programs, and therefore, do not necessarily equal the average of the individual crop year proportions.

[63] Note that 100% of the advisory programs in 1998 generated revenue that exceeded the farmer benchmark with USDA prices, despite the fact that less than 100% did so in corn and soybeans versus the same benchmark. This simply reflects a situation where some programs had gains above the farmer benchmark in one commodity that more than offset the losses below the benchmark in the other commodity.

Overall, the directional performance results over 1995-2004 suggest several findings. First, advisory programs in corn only marginally beat market benchmarks, but tend to consistently beat farmer benchmarks. Second, advisory programs in soybeans tend to exhibit the opposite pattern, consistently beating market benchmarks but less frequently beating farmer benchmarks. Third, in terms of 50/50 revenue, advisory programs show some consistency in beating both the market benchmarks and the farmer benchmark. So, the results provide mixed performance evidence with respect to both the market and farmer benchmarks.

It is interesting to consider the directional results in light of the price range results in the previous section. To review, the price range results show that the frequency of advisory prices falling in the top-third of the price range is relatively low for both corn and soybeans. Advisory prices fall most frequently in the middle-third of the price range (about 60 to 70% on average). At the same time, the directional results show that corn and soybean advisory prices exceed both market benchmarks more than 50% of the time over 1995-2004. What this means is that advisory programs consistently generate prices above the mid-point of the price range (approximately equal to the applicable market benchmark) but do not typically generate prices in the top-third of the price range. More specifically, the average pricing performance of market advisory programs tends to fall in the upper-half of the middle-third of the price range for the 1995-2004 crop years.

Finally, it is also interesting to compare the directional pricing performance results for market advisory programs to that of other investment professionals. Malkiel (1999) reports a typical estimate of the proportion of active mutual funds managers that beat the stock market. Specifically, he shows that only a third of active mutual fund managers generate returns higher than the S&P 500 stock index over 1974-1998. By comparison, market advisory programs perform better, with a little more than half of the programs beating the market in corn and about two-thirds beating the market in soybeans. This divergence may simply reflect a unique time period in corn and soybean markets, relatively less efficient commodity markets, the skill of advisors, a return to risk, or some combination of these factors.

Average Price Performance

The third indicator of pricing performance is the average price (or revenue) of advisory programs relative to market and farmer benchmarks. This indicator also measures performance relative to benchmarks, but it takes into account both the direction and magnitude of differences from benchmark prices (or revenues).[64] The results found in Tables 28 and 29 parallel those based on the proportion beating the benchmarks. Average differences from market benchmarks

[64] Given that risk is not considered, this indicator is strictly applicable only to farm decision-makers with risk-neutral preferences. While this may seem unrealistic from a theoretical perspective, several observers suggest that farmers focus mainly on expected returns (e.g., Anderson and Mapp, 1996; Tomek and Peterson, 2001). More directly, Pennings et al. (2004) conduct a large-scale survey of advisory service subscribers in the U.S. and find that producers are more interested in the price-enhancing characteristics of market advisory service recommendations than risk-reducing features.

for corn over 1995-2004 (panel A: Table 28) range from 2 to 5¢ cents per bushel.[65] Average differences from farmer benchmarks for corn are larger, ranging from 9 to 11¢ cents per bushel. Average differences from market benchmarks for soybeans over 1995-2004 (panel B: Table 28) are substantial, ranging from 14 to 16¢ per bushel. In contrast, average differences from the farmer benchmarks for soybeans over 1995-2004 are smaller, equaling 4¢ per bushel for both farmer benchmarks. Average differences for 50/50 advisory revenue range from 5 to $7 per acre for market benchmarks over 1995-2004 and 8 to $12 per acre for farmer benchmarks (Table 29). Note that the average differences can mask considerable variability across the benchmarks within a crop year and across crop years. A dramatic example of this occurred in 2003 for soybeans (Panel B: Table 28), where the average difference from the 24-month market benchmark is +$0.27 per bushel, while the average difference for the farmer benchmark with market prices is -$1.48 per bushel.

An important consideration from an economic decision-making perspective is the size of average returns versus the farmer benchmarks. The average advisory return relative to the farmer benchmarks is 8 to $12 per acre, or about three percent of average farmer benchmark revenue. Even though returns are small and mainly from corn, they nonetheless represent a non-trivial increase in net farm income (defined as returns to farm operator management, labor and capital), which averages $61 per acre for grain farms in central Illinois over 1995-2004 (e.g., Lattz, Cagley and Raab, 2005).[66] The comparison does not account for yearly subscription costs, which is not a major problem because subscription costs are quite small relative to revenue. As noted earlier, subscription costs average only 20¢ per acre for a 2,000 acre farm and 80¢ per acre for a 500 acre farm. A more serious issue is fully accounting for the cost of implementing, monitoring and managing the marketing strategies recommended by advisory programs. Such costs are difficult to measure, but may well be substantial (Tomek and Peterson, 2001).

At this juncture, the findings should be considered only suggestive. The reason is that the statistical significance of the results has not been investigated. In other words, are the returns to marketing advice simply the result of random chance or do they reflect truly positive pricing performance? A number of different statistical tests can be used to determine the significance of observed differences in sample means. In the present context, it is critical to recognize that there is a "natural" pairing in the sample data that can be used to increase the power of statistical tests (Snedecor and Cochran, 1989). More specifically, net advisory prices and benchmark prices for the same crop year are paired, in the sense that the same crop year receives different "treatments" from advisory programs and benchmarks. The treatments correspond to the differing marketing strategies used by advisory programs and benchmarks. Given that the

[65] Differences are calculated as advisory price minus benchmark price. So, a positive difference indicates an advisory price above the benchmark price and *vice versa*.

[66] Net farm income is defined specifically as, "…the value of farm production, less total operating expenses and depreciation, plus gain or loss on machinery or buildings sold. Net farm income includes the return to the farm and family for unpaid labor, the interest on invested capital, and the returns to management." (Lattz, Cagley and Raab, 2005, p.3) The average net farm income reported in the text is based on northern and central Illinois grain farms with soil ratings from 86 to 100.

sample data are paired, the appropriate test of the null hypothesis of zero difference between the mean of net advisory price or revenue and benchmarks is the paired *t*-test.[67]

Application of the paired *t*-test to average return performance is complicated by the fact that net prices across programs are positively related. This type of statistical test assumes that sample differences are generated independently (Snedecor and Cochran, 1989, pp. 101). It should come as no surprise that this assumption is violated for market advisory programs. Many of the programs appear to use similar methods of analysis and all make heavy use of similar supply and demand information (primarily from the USDA). Furthermore, alternative programs offered by the same advisory service are likely to generate similar pricing results. Statisticians call this an "implicit factor" problem.

Correlation coefficients estimated across advisory prices or revenues provide the most direct evidence on the magnitude of the dependence problem. However, the sample is not large enough to independently estimate all possible pair-wise correlations.[68] Useful evidence can be generated by estimating "market model" regressions for each commodity. This entails simply regressing net advisory prices or revenue for a given program on a market benchmark. If net advisory prices or revenue share a common "market factor" the explanatory power of the regressions will be high. In order to maximize the number of time-series observations available for each program, the sample for this analysis is limited to the 15 programs active in all 10 crop years. The explanatory power of the market model regressions turns out to be quite substantial, with an average R^2 of 0.73 in corn, 0.76 in soybeans and 0.77 for revenue, and the regressions all have positive slope estimates.[69, 70]

The high level of dependence across net advisory prices and revenue basically creates an information problem in the sample. Take the case of corn. There are 259 computed net advisory prices across all programs and crop years. However, the 259 net advisory prices are not independent, due to the strong positive correlation across programs. The key question is the amount of independent information contained in the sample of 259 net advisory prices. It is not possible to precisely estimate the true number of independent observations, but it is less than 259. Similar logic holds for soybeans and 50/50 advisory revenue.

The bottom-line from this discussion is that an assumption of independence for advisory program returns will overstate the reliability of sample estimates. This in turn will bias

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[67] See Irwin, Good and Martines-Filho (2006) for a detailed discussion of the statistical model underlying this test and related assumptions.

[68] Assume 25 advisory programs are included in each crop year over 1995-2004. Then, a total of 300 pair-wise correlation coefficients would have to be estimated. However, the sample would only contain 250 observations. There simply is not enough information (degrees of freedom) to estimate each correlation independently.

[69] The full set of regression results is available from the authors upon request.

[70] See Cabrini et al. (2004) for a detailed analysis of price and revenue correlations for a similar sub-set of advisory programs.

statistical tests towards a conclusion that pricing performance is significantly positive. The approach taken here to deal with the problem is "conservative." Specifically, statistical tests assume the minimum possible number of independent observations in the sample. This minimum is 10 observations, one for each crop year. The tests are conservative since conclusions are based on the minimal possible assumption about the amount of information in the sample. If test results based on this conservative assumption indicate statistical significance, then a high degree of confidence can be placed on conclusions. The cost of this approach is an increased probability that positive pricing performance is mistakenly attributed to chance.

Implementing the conservative testing approach is straightforward.[71] First, the average net advisory price or revenue is computed across all programs active in a crop year, and it is considered the return for an "average" advisory program. Second, the averaging process is repeated for each of the crop years to form a sample of 10 observations for the average advisory program. These averages can be found in Tables 18 through 20 under the "Descriptive Statistics" heading. Third, benchmark prices or revenues are subtracted from each of the average advisory prices or revenues. Fourth, a paired *t*-test is applied to the 10 difference observations to determine if average return performance is statistically significant.

Differences from the benchmarks for each crop year and statistical test results for an average advisory program are presented in Table 30. Note that average differences reported in Table 30 are nearly identical to those reported in Tables 28 and 29. This outcome is not surprising. The average differences in Table 30 assume an equal weighting of the 10 crop years, while the average differences in Tables 28 and 29 assume an equal weighting of each net advisory price or revenue in the sample. The two types of averages differ only because the number of advisory programs changes across crop years. Since this change is quite small across crop years, the difference in the two types of averages is negligible (see footnote 54 for a more detailed discussion).

The impact of the conservative approach to testing the significance of average differences is reflected in the standard error estimates. This statistic measures the "typical" error, without regard to sign, in estimating the average difference between advisory programs and a particular benchmark (Mirer, 1995, p. 238).[72] For example, the standard error estimate for the average difference in corn versus the 24-month market benchmark indicates that the typical error in estimating the true difference, without regard to sign, is 2¢ per bushel. A measure of reliability is needed because a sample is being used to make an inference about the "true" population difference, and the sample will not perfectly reflect the characteristics of the population. This is the essence of the role of random chance in estimation. The key point in this regard is that

[71] This test was first proposed by Fama and MacBeth (1973) and has been widely applied in studies of stock market returns. See Irwin, Good and Martines-Filho (2006) for a complete discussion of the issues involved in applying the test to advisory program returns.

[72] In more formal terms, "typical" means one can be 95% confident the true value of the difference will be contained in an interval about two standard errors above and below the average difference estimate.

standard error estimates vary inversely with sample size.[73] As a result, standard error estimates (typical estimation errors) will be much larger if it is assumed that 10 independent observations are available as opposed to, say, 259 independent observations.

With this background, the statistical test results in Table 30 can be considered. The relevant information in the sample for testing statistical significance is summarized by the *t*-statistic, which is just the ratio of the average difference estimate to the standard error estimate. A two-tail *p*-value indicates the probability of observing a value of the *t*-statistic (or higher in absolute value) across many random samples. It is usually argued that *p*-values must be equal to or smaller than 0.05 to confidently conclude that average differences do not equal zero (Griffiths, Hill and Judge, 1993, p. 134). Stated differently, there should be less than a 1 out of 20 chance that the wrong conclusion is reached. In corn, the *p*-value for the average difference versus the 24-month market benchmark is larger than 0.05, so it can be concluded that the 2¢ average difference is insignificantly different from zero. Just the opposite conclusion is reached for the 5¢ average difference versus the 20-month benchmark. The *p*-value of 0.00 indicates the average difference of 9¢ per bushel versus the farmer benchmark with USDA prices in corn is highly significant. The 0.07 *p*-value for the farmer benchmark with market prices in corn just misses the 0.05 cutoff for significance. In soybeans, the *p*-values for average differences versus both market benchmarks are smaller than 0.05, so it can be concluded that the average differences are significantly different from zero. Neither of the average differences in soybeans versus the farmer benchmarks is significantly different from zero. Similar to soybeans, *p*-values for average revenue differences versus both market benchmarks are smaller than 0.05, so it can be concluded that the both average revenue differences of 5 and $7 per acre are significantly different from zero. Neither of the average revenue differences versus the farmer benchmarks is significantly different from zero, although the $9 per acre average difference versus the farmer benchmark with USDA prices just misses the cutoff for significance.

Overall, the test results with respect to market benchmarks generally indicate statistically significant average return performance in corn, soybeans and 50/50 advisory revenue. Results with respect to the farmer benchmarks indicate statistically significant performance only with respect to the farmer benchmark with USDA prices in corn. When viewing statistical test results like these, it is always important to assess the sensitivity of the results to alternative assumptions. One possibility is that the results may differ when examined in terms of percentage returns instead of unit returns (¢ per bushel or $ per acre). In other words, a 10¢ average difference will be much higher in percentage terms for corn compared to soybeans because the level of corn prices is much lower.

Percentage differences for corn, soybeans and revenue over 1995-2004 are shown in Table 31. Average differences between the advisory programs and benchmarks for corn are 0.7%, 2.3%, 4.2% and 6.2% for the 24-month market, 20-month market, farmer benchmark with USDA prices and farmer benchmark with market prices, respectively. The same average

[73] The standard error of the average difference is estimated as $\hat{\sigma}_d / \sqrt{T}$, where $\hat{\sigma}_d$ is the standard deviation of differences across crop years and *T* is the sample size (10 in this case).

differences for soybeans are 2.7%, 2.5%, 1.2% and 1.7% and for revenue 1.6%, 2.4%, 3.0% and 4.2%, respectively. With one exception, the same hypothesis test conclusions are reached based on the percentage differences and the unit differences. The exception is the difference between advisory prices and the farmer benchmark with market prices in corn, which is significant using percentage differences but is not when using unit differences. These results indicate that average pricing (or revenue) performance results are not overly sensitive to whether average differences are measured in dollars per bushel or percentage terms.

While not as obvious, the marketing loan strategy assumed for the market benchmarks may influence test results. As discussed in the "Market Benchmarks" section, it is assumed that LDP/MLGs are taken when grain is delivered. The result is that bushels forward contracted before harvest receive the LDP/MLG available during the early part of harvest, and in effect, remaining bushels receive the average LDP/MLG available for the rest of the marketing year. This approach is consistent with the original intent of the loan program to assure that farmers do not have to sell crops below the loan rate, regardless of the timing of their sales. However, there is a second and equally plausible strategy based on the theory of storable commodity markets. This theory predicts that spot prices will increase linearly after harvest at the rate of storage costs (e.g., Tomek and Robinson, 2003, Ch. 9). Hence, the difference between a fixed loan rate and the market price will be the largest at harvest. If this theory is correct, the optimal strategy for a prudent farmer following the market benchmark strategy would be to take the LDP/MLG available at harvest. Furthermore, if market advisors and farmers are in reality aware of this pattern and take advantage of it, existing market benchmarks may be biased downwards due to the requirement of taking the LDP/MLG available on the date of post-harvest sales instead of the presumably larger harvest LDP/MLG.

Market benchmarks over 1998-2004 are recomputed using the average harvest LDP/MLG to test whether performance results are sensitive to the assumed LDP/MLG strategy. Differences from the revised benchmarks for each crop year and statistical test results for an average advisory program are presented in Table 32. Note that differences between advisory programs and farmer benchmarks are unaffected because actual LDP/MLG rates are applied to the farmer benchmarks and these do not change between Tables 30 and 32. The impact of changing the LDP/MLG strategy is most easily seen by comparing the average differences versus the market benchmarks in Table 32 to those found in Table 30. Average differences for advisory programs versus the 24-month benchmark based on the average harvest LDP/MLG decline by 3¢ per bushel for corn, 3¢ cent per bushel for soybeans and $3 per acre for 50/50 revenue. Average differences for advisory programs versus the 20-month benchmark based on the average harvest LDP/MLG decline by 4¢ per bushel for corn, 4¢ cents per bushel for soybeans and $4 per acre for 50/50 revenue.[74] Note that the decline in the average differences exactly equals the increase in the market benchmarks due to the change in LDP/MLG strategy. The magnitude of the declines may not appear large in absolute terms but they are large relative to the size of the average differences versus the market benchmarks originally reported in Table

[74] Differences reported in the text may not equal differences of the averages reported in Tables 26 and 28 due to rounding.

30. For example, the decline in average revenue using harvest LDP/MLGs is 67% versus the 24-month market benchmark and 56% versus the 20-month market benchmark. In addition, three of the five average differences versus market benchmarks that are statistically significant in Table 30 become statistically insignificant as a result of the change in LDP/MLG strategy (corn versus the 20-month market benchmark, revenue versus the 24-month market benchmark and revenue versus the 20-month market revenue). In sum, these results indicate that performance results relative to market benchmarks are sensitive to the assumed marketing loan strategy for market benchmarks.

Another potential source of sensitivity in the test results is the assumption about storage costs. All of the results to this point are based on commercial storage costs. As noted earlier, net advisory prices and 50/50 revenue also are computed using on-farm variable costs, which are substantially lower than commercial storage costs (interest opportunity costs are the same under on-farm and commercial scenarios). It is possible for average return performance results to differ across the two storage cost assumptions due to differences in the average length of storage for advisory programs, market benchmarks and farmer benchmarks. Average difference test results using on-farm variable storage costs are presented in Table 33 for the 2000-2004 crop years. The analysis is limited to the last five crop years because on-farm storage costs were not introduced to AgMAS evaluations until the 2000 crop year. Average difference results for the same five crop years using commercial storage costs are presented in Table 34. The change in average differences moving from commercial to on-farm storage costs is small, ranging from -3 to +2¢ per bushel for corn, -3 to 0¢ per bushel for soybeans and -3 to +$2 per acre for revenue. A pattern is present in the changes, with average differences between the advisors and market benchmarks unchanged to larger with on-farm variable costs and average differences between the advisors and farmer benchmarks smaller with on-farm variable costs. The explanation for this pattern can be found in Figures 9 and 10. Figure 9 implies that advisors tend to store more corn and soybeans than the assumed strategy for market benchmarks, and hence, advisors benefit relatively more from the lower on-farm storage costs. Comparison of Figures 9 and 10 shows that farmers tend to store more than advisors so farmers benefit relatively more from the lower on-farm storage costs. The change to on-farm storage also results in two cases where statistical significance is lost (corn: farmer benchmark with USDA prices and 50/50 revenue: 20-month market benchmark). Nonetheless, the change to on-farm storage costs does not change qualitative conclusions about the average pricing performance of advisory programs.

To summarize, the alternative results indicate that average pricing performance of advisory programs is relatively insensitive to re-stating differences in percentage terms or applying on-farm variable storage costs. However, performance results are relatively sensitive to the marketing loan strategy assumed for market benchmarks.

Average Price and Risk Performance

Comparison of average advisory prices (or revenues) relative to benchmarks is an important indicator of performance. However, average price comparisons may not provide a complete picture of performance. For example, two advisory programs can generate the same average advisory price, but the risk of the programs may differ substantially. The difference in

risk may be the result of using different pricing tools (cash, forward, futures or options), different timing of sales and variation in the implementation of marketing strategies.

A number of theoretical frameworks have been developed to analyze decision-making under risk. One of the simplest and most popular is the mean-variance (EV) model, which uses variance as a measure of risk. The basic idea in this case is to look at risk as the chance farmers 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 (mean) 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.

To apply the EV model to a particular decision, either distributions of outcomes must be normal or decision-makers must have quadratic utility functions (Hardaker, Huirne and Anderson, 1997, p.141). If either or both of these conditions hold, then risky choices can be divided into efficient and inefficient sets based on the famous EV efficiency rule: if the mean of choice A is greater than or equal to the mean of choice B and the variance of A is less than or equal to the variance of B, with at least one strict inequality holding, then A is preferred to B by all risk-averse decision makers. Since quadratic utility has the unlikely characteristic that absolute risk aversion increases with the level of the outcome, application of the EV model usually is based upon an assumption of normally distributed outcomes. This presents a potential problem in the case of market advisory programs that employ options strategies. Such strategies are designed to create non-normal price distributions by truncating undesirable prices, either on the downside or the upside, or both. Fortunately, simulation analysis suggests that the EV model produces reasonably accurate results even in cases where options strategies are employed (Hanson and Ladd, 1991; Ladd and Hanson, 1991; Garcia, Adam and Hauser, 1994).

The basic data needed for assessing market advisory pricing performance in an EV framework are presented in Table 35. For each of the 15 advisory programs tracked in all 10 crop years of the AgMAS study, the ten-year average net advisory price or revenue and standard deviation of net advisory price or revenue is reported. The average price and standard deviation of the four benchmarks also are reported.[75] Standard deviation is substituted for variance as the

[75] For a given advisory program, the formula for estimating 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 crop years in the sample, y_t is the advisory program's net price for the t^{th} crop year and $\bar{y}$ is the average net advisory price over the T crop years.

measure of risk because it is easier to understand. Performance results are the same whether standard deviation or variance is used to measure risk (Hardaker, Huirne and Anderson, 1997, p.143), hence the use of the simpler measure. Standard deviation estimates can be thought of as the "typical" variation in net advisory prices from year-to-year. The larger the standard deviation for an advisory program, the less likely a farmer 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.

The sample of advisory programs for the EV analysis is limited to those which are tracked all 10 crop years in order to maximize the number of observations available to estimate individual program risk (standard deviation).[76] Even with this restriction, 10 observations is a relatively small sample for estimating the risks of market advisory programs, and hence, the standard deviations reported in Table 35 may be somewhat inaccurate estimators of the true risks of advisory programs. With that in mind, the standard deviations suggest that the risk of advisory programs varies substantially. In corn, the standard deviations range from a low of $0.18 per bushel to a high of $0.63 per bushel. In soybeans, the standard deviations range from a low of $0.53 per bushel to a high of $1.05 per bushel. Finally, revenue standard deviations for the 15 programs range from a low of $26 per acre to a high of $57 per acre. With the exception of the farmer benchmark with market prices in corn and soybeans, standard deviations of the benchmarks tend to be near the average standard deviation of the 15 advisory programs.

Just as in the previous section, it is important to consider the level of aggregation for the EV analysis. One possibility is to examine the mean and standard deviation of the average advisory program constructed for the average price tests. Unfortunately, this is not useful in the present context because the risk of the average program will be smaller than that typically experienced by subscribers to individual advisory programs (due to diversification effects). A better procedure is to consider a single randomly selected advisory program (e.g., Elton, Gruber and Rentzler, 1987). Estimates of the average price and risk of a randomly selected advisory program are found by taking the average across the average price and standard deviation estimates, respectively, for the 15 advisory programs presented in Table 35. The resulting estimates, presented in the row labeled "Randomly Selected Program," reflect the average price and risk for a strategy of selecting at random one of the 15 programs over 1995-2004.

The average price and risk (standard deviation) for the randomly selected advisory program, individual programs and the benchmarks are plotted in Figure 21. Each figure is divided into four quadrants based on the average price (or revenue) and standard deviation of the randomly selected advisory program ("average program"). Any observation in the upper left quadrant of each chart has a higher average price (or revenue) and less risk than the randomly selected program. According to the EV efficiency rule introduced earlier, individual programs

[76] The restriction means that only advisory programs active all 10 crop years are included in the average price and risk evaluation, and hence, there is the potential for survivorship bias in the average price and risk comparisons to the benchmarks. As shown earlier in Table 25, survivorship bias appears to be negligible, with the average corn and soybean net advisory price for the 15 programs one cent more than and equal to the average price computed across all advisory programs active in the 1995-2004 sample period, respectively.

or benchmarks in this quadrant are said to "dominate" the randomly selected program. A risk-averse farmer will prefer an individual program or benchmark in this case. Contrarily, observations in the lower right quadrant have a lower price and more risk than the randomly selected program. According to the EV efficiency rule, the randomly selected program dominates individual programs or benchmarks in this quadrant. A risk-averse farmer will prefer the randomly selected advisory program in this case. The two remaining quadrants reflect a higher price and more risk than the randomly selected program or a lower price and less risk than the randomly selected program. The randomly selected program neither dominates nor is dominated in these two quadrants. A risk-averse farmer's choice in these cases depends on personal preference for risk relative to average price.[77]

The data plotted in panel A of Figure 21 indicate that a randomly selected program in corn has a higher average price and lower standard deviation than three of the four benchmarks, and hence, advisory programs dominate these three benchmarks. The exception is the 24-month market benchmark, where the randomly selected program has both a higher average price and standard deviation. Panel B of Figure 21 indicates that a randomly selected program in soybeans does not dominate either of the market benchmarks, as the average program has a higher average price and a higher standard deviation compared to the market benchmarks, but does dominate both farmer benchmarks, due primarily to the substantially lower risk of the average program. It is interesting to observe in Panel C of Figure 21 that a randomly selected program does not dominate any of the four benchmarks in terms of 50/50 revenue. The randomly selected advisory program has the highest average revenue compared to the four benchmarks but also has the highest risk. It is also interesting to note that a randomly selected advisory program is not dominated by any of the benchmarks across corn, soybeans and 50/50 revenue.[78] Finally, the same dominance results are summarized in the bottom four rows of Table 35, where a "dagger" symbol indicates the randomly selected advisory program dominates a particular benchmark.

The EV comparisons indicate that consideration of risk weakens evidence about the pricing performance of advisory programs in several cases. Specifically, advisory programs in soybeans and 50/50 revenue significantly outperform both market benchmarks based on average return alone, but when both average return and risk are considered, advisory programs no longer dominate due to higher risk. However, from an economic decision-making perspective, consideration of risk does not fundamentally alter qualitative conclusions about the economic

[77] Dominance comparisons can also be made between individual advisory programs. To do this, quadrants would be drawn based on the position of the "base" advisory program. Dominance comparisons then follow the same rules as used for benchmark dominance comparisons. It is possible for an individual program to be dominated by a benchmark, yet at the same time dominate other advisory programs.

[78] A joint statistical test of mean-variance equivalence developed by Collender (1989) is applied to the average prices and standard deviations of the randomly selected program and the benchmarks. The test results indicate that significance is not found for any case at the five percent level. This result is not surprising given the relatively small sample size available for testing. In addition, Collender's test does not take into account the paired nature of the comparisons, which reduces the power of the test in the present application. A joint test of mean-variance equivalence for paired samples has been developed (Bradley and Blackwood, 1989), but it cannot be applied here because a time-series of returns is not available for the randomly selected program.

significance of advisory program revenue versus the farmer benchmarks. The average advisory return relative to the farmer benchmarks is $10 per acre with only a marginal increase in risk. As noted in the previous section, this return is small but nonetheless represents a non-trivial increase in net farm income per acre for grain farms in central Illinois.

Finally, the mean-variance evaluation presented in this section can be extended to portfolios of advisory programs. For example, a soybean portfolio might consist of 50% marketed by advisory program #1 and 50% marketed by advisory program #2. The potential improvement in performance by following a combination of programs depends on the degree that net advisory prices or revenues are uncorrelated. Stark et al. (2003) analyze the potential risk reduction among market advisory programs for corn and soybeans. Under the assumption that programs are equally-weighted and randomly-selected (naïve diversification), results from this study show that increasing the number of programs reduces portfolio expected risk, but the marginal decrease in risk from adding a new program decreases rapidly with portfolio size. The risk reduction benefit from this type of diversification among advisory programs is relatively small because advisory prices, on average, are highly correlated. For example, a one service portfolio has only a 20%, 16% and 32% higher standard deviation than the minimum risk portfolio (all programs equally-weighted) for corn, soybeans and 50/50 revenue, respectively. Most risk reduction benefits are achieved with small portfolios. For instance, a four service portfolio has only 5%, 4% and 9% higher risk than the minimum risk portfolio for corn, soybeans and 50/50 revenue, respectively. Based on these results, there does not appear to be strong justification for farmers adopting portfolios with a large number of advisory programs.

For a more complete analysis of the possible benefits from diversification among advisory programs, it is necessary to evaluate portfolios constructed using modern portfolio theory (MPT). Under this approach, an efficient set of optimal portfolios of market advisory programs is constructed by minimizing portfolio variance for each level of expected price or revenue. The resulting optimal portfolios generally will not be equally-weighted across programs. It is possible for an optimal portfolio of advisory programs to generate higher prices and less risk than a benchmark, even if individual advisory programs that make up the portfolio do not. Cabrini et al. (2004) estimate mean-variance efficient portfolios of market advisory programs and find that the number of programs included in optimal portfolios usually is small, in the range of two to four programs in most cases. However, in some cases up to six advisory programs are included. The optimization results provide some evidence that an efficient portfolio provides greater risk/return benefits compared to market and farmer benchmarks. Efficient portfolios have superior out-of-sample performance in terms of average price, but fail to dominate the benchmarks out-of-sample in terms of both average price and risk. The main difficulty in generating optimal portfolios is obtaining accurate estimates of the means, variance and correlations for individual programs from the available data.

Predictability of Performance

Even if, as a group, advisory programs generate positive marketing returns, there is a wide range in performance for any given year. For example, soybean net advisory prices in 2003 vary from $3.69 per bushel to $7.67 per bushel (see Table 28). While this example is one of the most dramatic, the variation across advisors in other cases is substantial. This raises the

important question of the predictability of advisory program performance from year-to-year. In other words, is past performance indicative of future performance? Three types of predictability tests are used to answer this question: i) the predictability of "winner" and "loser" categories across crop years, ii) the correlation of advisory program ranks across crop years and iii) the differences between prices for "top" and "bottom" performing advisory programs across crop years. The testing procedures have been widely applied in studies of financial investment performance (e.g., Elton, Gruber and Rentzler, 1987; Irwin, Zulauf and Ward, 1994; Lakonishok, Shleifer and Vishny, 1992; Malkiel, 1995).[79]

The first test of predictability is based on placing advisory programs into "winner" and "loser" categories across adjacent crop years. This non-parametric test is robust to outliers, which is important when analyzing predictability across all advisory programs. For a given commodity, the first step in this testing procedure is to form the sample of all advisory programs that are active in adjacent crop years. The second step is to rank each advisory program in the first year of the pair (e.g., t = 1997) based on net advisory price. For example, the program with the highest net advisory price is ranked number one and the program with the lowest net advisory price is assigned a rank equal to the total number of programs for that commodity in the given crop year. Then the programs are sorted in descending rank order. The third step is to form two groups of programs in the first year of the pair: winners are those programs in the top half of the rankings and losers are programs in the bottom half. The fourth step is to rank each advisory program in the second year of the pair (e.g., $t+1$ = 1998) based on net advisory price and once again form winner and loser groups of programs. The fifth step is to compute the following counts for the advisory programs in the pair of crop years: winner t-winner $t+1$, winner t-loser $t+1$, loser t-winner $t+1$, loser t-loser $t+1$. If advisory program performance is unpredictable, approximately the same counts will be found in each of the four combinations. The appropriate statistical test in this case is known as Fisher's Exact Test (Conover, 1999, pp.188-189).[80]

Results of the winner and loser predictability tests are shown in Table 36. Winner and loser counts for individual crop years indicate a modest difference, at best, in the chance of a winner or loser in one period being a winner or loser in the subsequent period. As an example, consider the results for corn in 1997 and 1998. Of the twelve winners in 1997, seven are winners in 1998 and five are losers. Of the eleven losers in 1997, five are winners in 1998 and six are losers. In other words, the conditional probability of a winner from 1997 repeating in 1998 is 58% (7/12) and the conditional probability of a loser from 1997 repeating in 1998 is 55% (6/11). Averaged across all comparisons, the conditional probability of a winner (loser) repeating is 58% (56%) for corn, 57% (55%) for soybeans and 59% (58%) for 50/50 revenue. These probabilities are only marginally higher than what would result from flipping a coin (randomness). There are

[79] The tests presented in this section do not consider predictability of risk-adjusted performance measures. The ten-year sample period is not long enough to estimate risk-adjusted performance during sub-periods, which is required for predictability tests.

[80] Fisher's Exact Test is the appropriate statistical test because both row and column totals are pre-determined in the 2 x 2 contingency table formed on the basis of winner and loser counts.

only three cases (corn: 1999 vs. 2000; 50/50 revenue: 1999 vs. 2000 and 2003 vs. 2004) where individual year counts are significantly different from the equal distribution expected under an assumption of no predictability. Pooled results over 1995-2004 are statistically significant for 50/50 revenue. Caution should be used when considering significance in these cases because *p*-values likely are overstated due to the observed dependence across advisory programs.[81] Overall, these results imply that the performance of winning and losing advisory programs is at best marginally predictable through time.

While predictability may be limited across all advisory programs, it is possible for sub-groups of advisory programs to exhibit predictability. Specifically, predictability may be found only at the extremes of performance. That is, only top-performing programs in one year may tend to perform well in the next year, or only poor-performing programs may perform poorly in the next year, or both. This is the motivation for the second test of predictability, which is based on the correlation between ranks of all advisory programs active in adjacent pairs of crop years. For a given commodity, the first step in this testing procedure is to once again form the sample of all advisory programs that are active in both adjacent crop years. The second step is to rank each advisory program in the first year of the pair (e.g., $t = 1997$) based on net advisory price. Then the programs are sorted in descending rank order. The third step is to sort and rank the sample of programs in the second year of the pair (e.g., $t + 1 = 1998$). The fourth step is to compute the correlation coefficient between ranks for the two adjacent crop years. If advisory program performance is unpredictable, the estimated correlation will be near zero. Assuming the standard error of the correlation coefficient is approximately equal to $1/\sqrt{T}$, the appropriate statistical test is a *Z*-test.

Results of the rank correlation predictability test are presented in Table 37. Rank correlation coefficients for corn range from of -0.10 to +0.51. Statistically significant correlations are found for five of the nine comparisons in corn. The range of rank correlation coefficients for soybeans, +0.02 to +0.65, is similar to the range for corn. However, statistically significant correlations are found for only one of the nine comparisons in soybeans. Rank correlation coefficients for 50/50 revenue have the widest range, from -0.16 to +0.72. Statistically significant correlations are found for three of the nine revenue comparisons. Once again, caution should be used when considering the reported *p*-values, as they likely overstate the significance of the rank correlation estimates due to the dependence across advisory programs. Average rank correlation coefficients across the nine comparisons are nearly identical for corn, soybeans and 50/50 advisory revenue. With average values from 0.25 to 0.28, the rank correlations suggest marginal predictability in the pricing performance of top- and bottom-performing market advisory programs.[82]

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[81] Fisher's Exact Test assumes sample observations are independent. As discussed in the section on average price performance, this clearly is not the case, and therefore, the *p*-values reported in Table 34 likely overstate the true significance of the results.

[82] A related question is the consistency of performance for a given advisory program across corn and soybeans in the same crop year. In other words, is strong performance in one commodity associated with strong performance in the other commodity and vice versa? Rank correlations of advisory service performance across corn and soybeans are computed for each crop year over 1995-2004. The lowest rank correlation, -0.16, occurs in 2001 and the

The rank correlation tests results suggest it is useful to determine the magnitude of predictability in top- and bottom-performing advisory programs. Hence, the third test of predictability is based on the difference between net advisory prices for top- and bottom-performing advisory programs across adjacent crop years. For a given commodity, the first step in this testing procedure is to sort programs by net advisory price in the first year of the pair and form groups of programs. The first grouping consists of the top third of programs, middle third of programs and bottom third of programs. The second grouping consists of the top fourth of programs, second fourth of programs, third fourth of programs and bottom fourth of programs. The last grouping is simply to form the top two and bottom two programs. Notice that the groupings proceed from a relatively large number of programs in the top- and bottom-performing segments (e.g., thirds) to only a few programs (two). Hence, if advisory program performance from year-to-year is persistent at the extremes, these groupings should reveal it.

The second step of the grouping procedure is to compute the average net advisory price for the groups in the second year of the pair. Note that the same programs make up the groups in the first and second year of the pair. For example, the average price of the top fourth group formed in 1995 is computed for 1996. The third step is to compute the difference in average price for the top- and bottom-performing groups. If performance for the top- and bottom-performing groups is the same, the difference will equal zero. The appropriate statistical test in this case is a paired *t*-test of the difference in the means of the top- and bottom-performing groups. There are a total of nine comparisons (1995 vs. 1996, 1996 vs. 1997, 1997 vs. 1998, 1998 vs. 1999, 1999 vs. 2000, 2000 vs. 2001, 2001 vs. 2002, 2002 vs. 2003 and 2003 vs. 2004), so there are eight degrees of freedom for the *t*-test. Since differences are computed for an "average" advisory program in top- and bottom-performing groups, dependence across individual advisory programs is not an issue, and *p*-values for the *t*-test are unbiased. Carpenter and Lynch (1999) recommend this test because it is well-specified and among the most powerful in their comparison of several predictability tests for mutual funds.

Results for the *t*-test of predictability for the different groupings are shown in Table 38. The first column under each commodity heading shows the average price of the different groups in the first year of the comparisons (nine in total). The average price for the first year is "in-sample" because this is the formation year for the groups. The second column under each heading reports the average price of the same groups in the second year of the comparisons. The average price for the second year is "out-of-sample" because this is the year after formation of the groups. In all cases, the average price or revenue of the top group relative to the bottom group declines substantially from the first to the second year of the comparisons. Nonetheless, the average difference between top- and bottom-performing groups for the second year of the pair is consistently positive. Furthermore, the average differences increase substantially as the groupings become successively narrower. Programs in the top third beat the bottom third in the second year by an average of 10¢ per bushel in corn, 25¢ per bushel in soybeans and $11 per

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highest, +0.55, occurs in 2004. The average rank correlation over 1995-2004 across corn and soybean performance is +0.21, indicating that advisory program performance in one commodity has little relationship with the performance in the other commodity for the same year.

acre for revenue, while the top two programs beat the bottom two programs in the second year by an average of 19¢ per bushel in corn, 40¢ per bushel in soybeans and $30 per acre for revenue.[83] This pattern suggests predictability is most pronounced near the top and bottom of advisory program performance rankings. Statistical significance is observed in all three cases for thirds and fourths, but only two of three cases for the top- and bottom-two groups. It is not surprising that less statistical significance is found for top- and bottom-two comparisons since these groups only average net advisory prices for two programs. Consequently, average differences will be more volatile from year-to-year compared to average differences based on thirds and fourths. Finally, note that average prices for the top group out-of-sample also exceed benchmark prices for the same period (1996-2004). Top third returns beat the 24-month market benchmark by an average of 6¢ per bushel in corn, 28¢ per bushel in soybeans and $11 per acre for 50/50 revenue (not shown in Table 38). Top two returns beat the 24-month market benchmark by an average of 12¢ per bushel in corn, 52¢ per bushel in soybeans and $27 per acre for 50/50 revenue (not shown in Table 38).[84]

The grouped results appear to provide strong evidence that the performance of top- and bottom-performing market advisory programs can be predicted across adjacent crop years. However, the evidence is not sufficient to conclude that performance predictability is useful from an economic standpoint due to the overlapping nature of the marketing windows for each crop year. First, to the degree that old and new crop prices are correlated and advisory programs follow similar strategies across crop years, the overlapping may induce "artificial" predictability in performance across adjacent pairs of overlapping crop years. Second, the overlapping creates a practical problem if a farmer attempts to take advantage of the observed predictability. To see the point, consider the case of a farmer who uses 1995 performance results to select a top-performing advisory program. Since the 1995 marketing window ends on August 31, 1996, halfway through the 1996 marketing window and one day before the beginning of the 1997 marketing window, the farmer could not implement the selection of an advisory program until the 1997 crop year. Performance would have to persist across three crop years, 1995, 1996 and 1997, for a farmer to benefit from the predictability.

Grouped results for non-overlapping crop years are shown in Table 39. The testing procedure is the same as before, except there are only eight comparisons (1995 vs. 1997, 1996 vs. 1998, 1997 vs. 1999, 1998 vs. 2000, 1999 vs. 2001, 2000 vs. 2002, 2001 vs. 2003 and 2002 vs. 2004) and seven degrees of freedom for the paired *t*-test. The results are strikingly different than the previous results for overlapping crop years. Average differences between top- and bottom-performing groups in the second year of the pair are small and statistically insignificant in all cases. These results indicate predictability of pricing performance for top and bottom advisory programs is short-lived, in the sense that performance does not persist long enough to be taken advantage of by farmers.

[83] Average differences of the top and bottom groups may not equal the difference of the averages for the groups due to rounding.

[84] The complete set of comparisons to benchmark prices is available from the authors upon request.

The predictability results presented so far are all based on individual crop year comparisons. It is possible for performance to be predictable over longer time horizons, but unpredictable over shorter horizons due to the large amount of "noise" in performance over shorter horizons (e.g., Summers, 1986). This is consistent with the argument that over the long-term "cream rises to the top" in terms of performance. To assess longer-term predictability, the sample is again limited to the 15 programs active in all 10 crop years of the study. Next, net advisory prices (or revenues) are averaged for each of the 15 programs using two different sample splits: the first four crop years (1995-1998) versus the last five crop years (2000-2004) and the first five crop years (1995-1999) versus the last four crop years (2001-2004). The 1999 crop year in the first sample split and the 2000 crop year in the second sample split are excluded in order to make the averages for the two periods non-overlapping. The three tests of predictability are then applied to the two sets of averages for each sample split.

Winner-loser counts for the two sample splits in corn, soybeans and 50/50 revenue are quite close to that expected under randomness (results not shown). Rank correlations for the first sample split (1995-1998 vs. 2000-2004) are 0.28 for corn, 0.25 for soybeans and 0.32 for revenue. Rank correlations for the second sample split (1995-1999 vs. 2001-2004) are 0.59 for corn, 0.11 for soybeans and 0.47 for revenue. On average, the rank correlations are only modestly different from the year-to-year correlations reported in Table 37, and furthermore, only the rank correlation for corn in the second sample split is significantly different from zero. However, as shown in Tables 40 and 41, average differences presented between top- and bottom-performing programs for the two sample splits are positive in all but one case. Of particular interest are the results for the top two programs, which outperform the bottom two programs by 18¢ per bushel in corn, 46¢ per bushel in soybeans and $28 per acre for 50/50 revenue in the first sample split and by 10¢ per bushel in corn, 58¢ per bushel in soybeans and $22 per acre for revenue in the second sample split.[85] These appear to be substantial differences in economic terms. Nonetheless, there are a couple of reasons for viewing the evidence cautiously. First, only one "longer-term" comparison is available, and hence, it is not possible to test for statistical significance. Second, the results are heavily influenced by a single advisory program that, with one exception, is ranked first among the 15 programs in all sample splits for corn, soybeans and 50/50 revenue. If this advisory program is excluded from the analysis, the difference in performance between the top two and bottom two programs declines to 7¢ per bushel in corn, 20¢ per bushel in soybeans and $0 per acre for revenue in the first sample split and to 4¢ per bushel in corn, 27¢ per bushel in soybeans and $10 per acre for revenue in the second split.[86] In

[85] As noted earlier in the report, it is not likely that the results can be attributed to survivorship bias even though the comparisons are restricted to the 15 programs active in all 10 crop years. The average price for the 15 programs in corn over 2000-2004 and 2001-2004 is only two cents more the average price computed across all advisory programs active over 2000-2004 and 2001-2004, respectively. The average price for the 15 programs in soybeans over 2000-2004 and 2001-2004 actually is and one and two cents less than the average price computed across all advisory programs active over 2000-2004 and 2001-2004, respectively.

[86] The zero difference in average revenue for the first sample split may seem odd at first glance given the positive differences reported for corn and soybeans. While counter-intuitive, this result can occur because average differences for corn and soybeans times average yields over 1995-2004 generally does not equal average differences in revenue due to the negative correlation between prices and yields. In other words, positive differences in prices may be canceled out in terms of revenue depending on the relative movement of prices and yields across the sample.

addition, the exceptional pricing performance of this top-ranked program is associated with a 99% increase in risk compared to the average risk of the other 14 programs in corn, a 2% increase in soybeans and a 65% increase for 50/50 revenue.

Overall, the test results suggest that it is difficult to predict the performance of advisory programs based on past pricing performance, with the possible exception of the extremes of longer-term performance rankings. An important implication is that a strategy of chasing the latest "hot advisory program" is not likely to be successful. There is indirect evidence that many farmers engage in just this type of behavior when selecting advisory programs. Isengelidina et al. (2004) estimate that market advisory service subscribers switch programs once every 3.3 years. Only 28% of subscribers indicate that they have never switched market advisory programs. Similar behavior on the part of mutual fund investors has been shown to be costly in terms of realized performance (e.g., McDonald, 2003).

While test results based on past pricing performance alone are not encouraging, the results do not necessarily rule out other variables that may be useful for predicting performance. One obvious possibility is to sort programs into two groups: "futures and options" programs and "cash only" programs. As noted earlier in this report, several advisory services offer one set of recommendations for subscribers willing to trade in futures and/or options markets and another set of recommendations for subscribers who are only willing to make cash market sales. The average return for the two groups of programs is computed for each crop year over 1995-2004 and reported in Table 42.[87] Average differences are quite small, 1¢ per bushel for corn, 7¢ per bushel for soybeans and $2 per acre for revenue, and statistically insignificant. The evidence clearly points towards no predictable difference in the average pricing performance of "futures and options" programs and "cash only" programs. In other words, futures and options trading by advisory programs neither increases nor decreases average pricing performance.

Another interesting possibility is to relate the length of an advisory program's track record to pricing performance. If track record length over 1995-2004 proxies for the marketing experience of advisors, then a plausible argument can be made that programs with longer track records should outperform those with shorter track records. The distribution of track record lengths shown in Figure 1 indicates that the distribution is skewed to either extreme. This complicates sorting programs by track record length because of the very large differences in sample size that result. For example, the total sample size for all programs with track record lengths of 1 crop year is 6, while the total sample size for all programs with track record lengths of 10 crop years is 150. This disparity also implies that average prices for groups with small track lengths may be strongly influenced by the level of market prices during the period when the programs are active in the sample. Consequently, programs are sorted into only two groups based on track record length, programs with average or below average track record lengths (1 to 6 crop years) and programs with above average track record lengths (7 to 10 crop years), and

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[87] Advisory programs are categorized as "futures and options programs" and "cash only programs" based on the names provided by advisory services. Some "cash only" programs actually may occasionally recommend futures and options positions.

performance is evaluated only for 50/50 revenue to lessen price level impacts for programs with small track record lengths.[88] The results are striking, as average revenue for programs with average or below average track record lengths ($318 per acre) is the same as the average revenue for programs with above average track record lengths ($318 per acre). If track record length proxies for marketing experience, then the results indicate that the experience of the advisor is not helpful in predicting performance. Of course, there is the distinct possibility that track record length is a poor proxy for marketing experience of an advisor, especially when the sample is limited to only 10 crop years.

In conclusion, the tests presented in this section indicate it is difficult to predict the pricing performance of market advisory programs based on past pricing performance, type of program and track record length. While the tests presented in this section are the most comprehensive to date, there may be other variables that can predict performance. For example, Chevalier and Ellison (1999) study whether mutual fund performance is related to characteristics of fund managers that indicate ability, knowledge or effort and find that managers who attended higher-SAT undergraduate institutions generate systematically higher returns. Barber and Odean (2000) examine the trading records of individual stock investors and report that frequent trading substantially depresses investment returns. Similar factors, such as education levels of advisors, intensity of futures and options trading, or more general measures of the "marketing style" of advisory programs may be useful in predicting the performance. Cabrini, Irwin and Good (2005) provide some preliminary evidence that highly active advisory programs in corn and soybeans outperform less active programs.

Reliability of Performance Results

From a practical, decision-making perspective, a key consideration is the reliability of performance results. In other words, do the performance results for market advisory programs (as a group) over 1995-2004 provide a reliable guide to the future? The availability of only 10 crop years may lead some to argue that the sample is too "small" or "sparse" to draw conclusions about future pricing performance. There are several reasons why this is not likely to be the case. First, Anderson (1974) explores the reliability of agricultural return-risk estimates based on sparse data sets and finds that even as few as three or four observations can be useful for decision-making. This is corroborated by practical experience in other areas of agricultural decision-making. For example, a typical presentation of university yield trials includes only current year crop yields and two-year or three-year averages if available.[89] Despite the small samples, this type of yield trial data is widely used by farmers in making variety selections. Second, even though the number of crop years is somewhat limited, at least 23 advisory programs are tracked for each crop year. Pooling results across advisory programs and crop years increases available information on the pricing performance of advisory programs as a group. The observed dependence of returns across programs lessens the positive benefit of

[88] The sample size is 74 observations for the first group and 174 observations for the second group.

[89] The University of Illinois Variety Testing program is a well-known example of this type of yield trial. The results of this research program can be found at http://www.cropsci.uiuc.edu/vt/.

pooling but does not eliminate it. Third, the 1995-2004 crop years contain a surprisingly wide range of market conditions and price levels. This can be seen in Figure 22, which shows the average monthly spot market price of corn and soybeans for central Illinois over September 1973-August 2005.[90] Visual comparison of the AgMAS sample period to the entire time period suggests the AgMAS sample is broadly representative of the movement of corn and soybean prices in the long-run. In fact, both price series actually are more volatile during the AgMAS sample period. The standard deviation of monthly spot corn prices is $0.66 per bushel over September 1995-August 2005 compared to $0.53 per bushel over the entire September 1973-August 2005 time period. The standard deviation of monthly spot soybean prices is $1.37 per bushel over September 1995-August 2005 compared to $1.12 per bushel over the entire time period. The bottom-line is that market conditions are sufficiently variable over the 1995-2004 crop years to allow the "true" pricing performance of market advisory programs to be estimated with reasonable confidence.[91]

A different perspective on price movements during the AgMAS sample is provided in Figure 23. Here, average monthly corn and soybean prices over the full 24-month marketing window are plotted for the 1995-2004 and 1973-2004 crop years. Note that pre-harvest prices are based on forward contracts for harvest delivery, post-harvest prices are based on spot market prices and post-harvest prices are adjusted for commercial storage costs (LDP/MLGs are not included). Similar marketing assumptions are applied over 1973-1994 as in 1995-2004. Average monthly prices in Figure 23 are expressed as a percentage of the average harvest price to adjust for differences in the level of average harvest prices between 1995-2004 and 1973-2004. The result is a comparable picture of the average pattern of harvest equivalent prices within crop years for the two different sample definitions. For additional perspective, the average monthly price pattern over 1995-2004 also is plotted in Figure 24 using dollars per bushel units.

The two sets of crop year averages in Figure 23 reveal some interesting patterns. In corn, pre-harvest prices during 1995-2004 are higher for most months compared to the full 1973-2004 sample, while post-harvest prices follow quite similar patterns in both samples. In soybeans, just the opposite pattern results, with pre-harvest prices roughly equal for the two sample periods and post-harvest prices higher for several months during 1995-2004 compared to 1973-2004. These results suggest some deviation of seasonal price patterns over 1995-2004 from longer-term patterns. The deviations should not materially affect comparisons between advisory programs and market benchmarks since their marketing profiles are fairly similar (see Figure 9). However, the deviations will impact comparisons between advisory programs and farmer benchmarks. Recall that advisory programs performed better in corn versus the farmer benchmarks than in

[90] Following Hagedorn et al. (2005), September 1973 is selected as the starting point to maximize the number of observations available for analysis while at the same time representing a relatively stable period in terms of average price levels for corn and soybeans. Data before 1973 are not considered because numerous researchers have noted the large structural shift in price levels that occurred at this time (e.g., Goodwin, Schnepf, and Dohlman, 2005).

[91] It should be emphasized that this conclusion is limited to the pricing performance of market advisory programs as a group. Individual program pricing performance is estimated with less precision.

soybeans (see Table 30). The reason is that farmers undoubtedly do not market as heavily in the pre-harvest period (and consequently market more heavily in the post-harvest period) compared to advisory programs.[92] Therefore, the pre-harvest "premiums" in corn over 1995-2004 benefit advisors relative to farmers. The post-harvest "premiums" in soybeans have just the opposite effect, benefiting farmers relative to advisors. The longer-term price patterns over 1973-2004 suggest that these two effects are likely to diminish in the future.

On balance, the evidence and arguments presented in this section indicate that the performance results for market advisory programs (as a group) over 1995-2004 provide a reasonable guide to future performance. Some differences in seasonal price patterns are observed for the 1995-2004 crop years compared to the much longer sample of 1973-2004, but the differences do not affect basic findings about pricing performance. As with any statistical analysis, there is always the chance that some results are due to random chance rather than true differences in the performance of advisory programs and benchmarks.

Summary and Conclusions

The purpose of this research report is to evaluate the pricing performance of market advisory services for the 1995-2004 corn and soybean crops. Two basic questions are addressed in this study: 1) Do market advisory services, on average, outperform appropriate benchmarks? and 2) Do market advisory services exhibit persistence in their performance from year-to-year? No fewer than 23 market advisory programs are available for each crop year over 1995-2004. While the sample of advisory services is non-random, it is constructed to be generally representative of the majority of advisory services offered to farmers. Further, the sample of advisory services includes all programs tracked by the AgMAS Project over the study period, so pricing performance results should not be plagued by survivorship bias. The AgMAS Project subscribes to all of the services that are followed and records recommendations on a real-time basis, which should prevent pricing performance results from being subject to hindsight bias.

Explicit marketing assumptions are applied to the track records 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 facing a representative central Illinois corn and soybean farmer. Several key assumptions are: i) with a few exceptions, the marketing window for a crop year runs from September before harvest through August after harvest, ii) on-farm or commercial physical storage costs, as well as interest opportunity costs, are charged to post-harvest sales, iii) brokerage costs are subtracted for all futures and options transactions and iv) Commodity Credit Corporation (CCC) marketing loan recommendations made by advisory programs are followed wherever feasible. Based on these and other assumptions, the net price received by a subscriber to a market advisory program is calculated for the 1995-2004 corn and soybean crops.

[92] As noted in the "Farmer Benchmarks" section, surveys by Coble et al. (1999), Katchova and Miranda (2004) and USDA ARMS (2003) suggest that the amount priced by farmers in the pre-harvest period is in the range of 5% to 20%. By comparison, the average amount of pre-harvest pricing by advisory programs over 1995-2004 is 41% and 34% in corn and soybeans, respectively.

Two different types of benchmarks are developed for the performance evaluations. Efficient market theory implies that the return offered by the market is the relevant benchmark. In the context of this study, a market benchmark should measure the average price offered by the market over the marketing window of a representative farmer who follows advisory program recommendations. Both a 24-month and a 20-month market benchmark are specified in order to test the sensitivity of performance results to different market benchmark assumptions. Behavioral market theory suggests that the average return actually achieved by market participants as an appropriate benchmark. In the context of the present study, a behavioral benchmark should measure the average price actually received by farmers for a crop. Given the uncertainties involved in measuring the average price received by farmers, two alternative farmer benchmarks are specified. The market and farmer benchmarks are computed using the same assumptions applied to advisory program track records.

Five basic indicators of performance are applied to advisory program prices and revenues over 1995-2004. The first indicator of pricing performance is the proportion of advisory programs in the top-, middle- and bottom third of the price range. On average, the results show that the frequency of advisory programs pricing in the top-third of the corn price range over 1995-2004 is modest, between 17 and 25%. By far the largest average frequency occurs in the middle third of the corn price range, ranging from 58 to 63%. Price range results for soybeans are similar to the results for corn. The frequency of advisory programs pricing in the top-third of the soybean price is between 17 and 19% and the largest average frequency occurs in the middle third of the soybean price range, ranging from 67 to 69%. This evidence suggests that the average performance of market advisory programs relative to the pricing opportunities provided by the corn and soybean markets is modest at best.

The second indicator is the proportion of advisory programs that beat benchmark prices over 1995-2004. Advisory programs in corn have only a small to marginal chance of beating market benchmark prices (52 to 62%), but more consistently beat farmer benchmarks (69 to 71%). Advisory programs in soybeans tend to exhibit the opposite pattern, consistently beating market benchmarks (65 to 71%) but less frequently beating farmer benchmarks (58 to 63%). In terms of 50/50 revenue, advisory programs show some consistency in beating both the market benchmarks (59 to 68%) and the farmer benchmarks (64 to 67%). So, the results provide mixed performance evidence with respect to both the market and farmer benchmarks.

The third indicator is the average return of advisory programs relative to benchmarks over 1995-2004. Average differences from market benchmarks for corn range from 2 to 5¢ cents per bushel. Average differences versus farmer benchmarks for corn are larger, ranging from 9 to 11¢ cents per bushel. Average differences from market benchmarks for soybeans are substantial, ranging from 14 to 16¢ per bushel. In contrast, average differences from farmer benchmarks for soybeans are smaller, equaling 4¢ per bushel for both farmer benchmarks. Average differences for 50/50 advisory revenue range from 5 to $7 per acre for market benchmarks and 8 to $12 per acre for farmer benchmarks. Statistical test results with respect to market benchmarks generally indicate significant average return performance in corn, soybeans and 50/50 advisory revenue. Results with respect to the farmer benchmarks indicate statistically significant performance only with respect to one of the farmer benchmarks in corn.

An important consideration from an economic decision-making perspective is the size of average differences versus the farmer benchmarks. The average advisory return relative to the farmer benchmarks is about three percent of average farmer benchmark revenue. Even though this return is small and mainly from corn, it nonetheless represents a non-trivial increase in net farm income per acre for grain farms in central Illinois.

The fourth indicator is the average return and risk of advisory programs relative to benchmarks over 1995-2004. The results indicate that consideration of risk weakens evidence about the pricing performance of advisory programs in several cases. Specifically, advisory programs in soybeans and 50/50 revenue significantly outperform both market benchmarks based on average return alone, but when both average return and risk are considered, advisory programs no longer dominate due to higher risk. However, from an economic decision-making perspective, consideration of risk does not fundamentally alter qualitative conclusions about the economic significance of advisory program revenue versus the farmer benchmarks. The average advisory return relative to the farmer benchmarks is $10 per acre with only a marginal increase in risk.

The fifth indicator is the predictability of advisory program performance. "Winner" and "loser" predictability results are similar for corn, soybeans and advisory revenue. The conditional probability of winner and loser programs (top half and bottom half) repeating from year-to-year are only slighter higher than what would result from flipping a coin (randomness) and provide little evidence that pricing performance for all advisory programs can be predicted from past performance. The performance of top- and bottom-performing programs from year-to-year does not appear to be predictable in a useful sense either. For example, comparisons of non-overlapping crop years show that average differences between top- and bottom-performing groups are small and statistically insignificant in all cases. Overall, the test results suggest that it is difficult to predict the year-to-year pricing performance of advisory programs based on past pricing performance. However, there is some evidence that performance is more predictable over longer time horizons, particularly at the extremes of performance rankings.

In conclusion, the results of this study provide a comprehensive picture of the performance of market advisory programs in corn and soybeans. There is limited evidence that advisory programs as a group outperform market benchmarks, particularly after considering risk. This supports the view that grain markets (cash, futures and options) are efficient with respect to the types of marketing strategies available to farmers (e.g., Zulauf and Irwin, 1998) over the view that grain markets are inefficient and provide substantial opportunities for farmers to gain additional profits through marketing (e.g., Wisner, Blue and Baldwin, 1998). The evidence is more positive with respect to farmer benchmarks, even after taking risk into account. This raises the possibility that even though advisory services do not "beat the market," they nonetheless provide the opportunity for some farmers to improve performance relative to the market. Mirroring debates about stock investing (e.g., Damato, 2001), the relevant issue is then whether farmers can most effectively improve marketing performance by pursuing "active" strategies, like those recommended by advisory services, or "passive" strategies, which involve routinely spreading sales across the marketing window. In recent years, a number of grain companies have begun to offer averaging or "indexing" contracts that allow farmers to easily implement a

passive approach to marketing (Smith, 2001). The rising interest in these new marketing contracts suggests the potential for historic changes in the approach farmers' use to market crops. Future research that provides a better understanding of the costs and benefits of active versus passive approaches to marketing will be especially valuable.

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Table 1. Market Advisory Programs Tracked by the AgMAS Project, Corn and Soybeans, 1995-2004 Crop Years

Market Advisory Program	Crop Year										Comments
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	
Ag Alert for Ontario		✓									Included in 1996. After further review, deemed not directly applicable to US producers and dropped.
Ag Financial Strategies							✓	✓	✓	✓	Established program first tracked for the 2001 crop year.
Ag Market Professional (cash only)										✓	Established program first tracked for the 2004 crop year.
Ag Market Professional (hedge)										✓	Established program first tracked for the 2004 crop year.
Ag Profit by Hjort	✓	✓	✓	✓	✓						Went out of business at the end of August 2000.
Ag Review	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Included for all corn and soybean crop years to date.
AgLine by Doane (cash only)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Included for all corn and soybean crop years to date.
AgLine by Doane (hedge)		✓	✓	✓	✓	✓	✓	✓	✓	✓	New program for corn in 1996 and soybeans in 1998.
AgResource	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Included for all corn and soybean crop years to date.
Agri-Edge (cash only)	✓	✓	✓								Went out of business at the end of January 1998.
Agri-Edge (hedge)	✓	✓	✓								Went out of business at the end of January 1998.
Agri-Mark	✓	✓	✓	✓	✓	✓					Stopped providing specific recommendations regarding cash sales. Dropped after 2000 crop year.
AgriVisor (aggressive cash)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Included for all corn and soybean crop years to date.
AgriVisor (aggressive hedge)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Included for all corn and soybean crop years to date.
AgriVisor (basic cash)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Included for all corn and soybean crop years to date.
AgriVisor (basic hedge)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Included for all corn and soybean crop years to date.
Allendale (futures & options)		✓	✓	✓	✓	✓	✓	✓	✓	✓	New program for corn only in 1996.
Allendale (futures only)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Included for all corn and soybean crop years to date.
Brock (cash only)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Included for all corn and soybean crop years to date.
Brock (hedge)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Included for all corn and soybean crop years to date.
Cash Grain					✓	✓					Went out of business at the end of September 2000.
Co-Mark						✓	✓	✓	✓		Went out of business at the end of July 2003.
Freese-Notis	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Included for all corn and soybean crop years to date.
Grain Field Marketing							✓	✓	✓	✓	Established program first tracked for the 2001 crop year.
Grain Field Report	✓										Stopped providing specific recommendations regarding cash sales. Dropped after 1995 crop year.
Grain Marketing Plus						✓	✓	✓			Went out of business at the end of March 2003.
Harris Weather/Elliott Advisory	✓	✓									Stopped providing specific recommendations regarding cash sales. Dropped after 1996 crop year.
North American Ag	✓										Stopped providing specific recommendations regarding cash sales. Dropped after 1995 crop year.
Northstar Commodity							✓	✓	✓	✓	Established program first tracked for the 2001 crop year.
Pro Farmer (cash only)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Included for all corn and soybean crop years to date.
Pro Farmer (hedge)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Included for all corn and soybean crop years to date.
Progressive Ag		✓	✓	✓	✓	✓	✓	✓	✓	✓	Established program first tracked for the 1996 crop year.
Prosperous Farmer	✓										Stopped providing specific recommendations regarding cash sales. Dropped after 1995 crop year.
Risk Management Group (cash only)					✓	✓	✓	✓	✓	✓	Program discontinued at the beginning of March 2005.
Risk Management Group (futures & options)					✓	✓	✓	✓	✓	✓	Program discontinued at the beginning of March 2005.
Risk Management Group (options only)					✓	✓	✓	✓	✓	✓	Program discontinued at the beginning of March 2005.
Stewart-Peterson Advisory Reports	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Included for all corn and soybean crop years to date.
Stewart-Peterson Strictly Cash	✓	✓	✓	✓	✓	✓					Program discontinued at the end of October 2000.
Top Farmer Intelligence	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Included for all corn and soybean crop years to date.
Utterback Marketing Services			✓	✓	✓	✓	✓	✓	✓	✓	Established program first tracked for the 1997 crop year.
Zwicker Cycle Letter	✓	✓	✓	✓							Merged with AgriVisor for the 1999 crop year and no longer included.

Note: A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest.

Table 2. Number of Recommended Transactions for 41 Market Advisory Programs, Corn, 1995-2004 Crop Years

	Number of Transactions									
Market Advisory Program	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Ag Alert for Ontario	N/A	24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Financial Strategies	N/A	N/A	N/A	N/A	N/A	N/A	42	22	60	90
Ag Market Professional (cash only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	15
Ag Market Professional (hedge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	119
Ag Profit by Hjort	7	7	5	11	4	N/A	N/A	N/A	N/A	N/A
Ag Review	18	26	14	9	16	13	13	14	16	24
AgLine by Doane (cash only)	9	8	6	11	10	14	12	7	10	11
AgLine by Doane (hedge)	N/A	10	10	19	12	18	12	7	15	13
AgResource	17	24	32	35	12	43	27	27	65	59
Agri-Edge (cash only)	10	9	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Edge (hedge)	17	13	20	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Mark	24	7	12	15	8	28	N/A	N/A	N/A	N/A
AgriVisor (aggressive cash)	15	12	9	14	18	5	8	6	6	7
AgriVisor (aggressive hedge)	16	18	13	34	22	5	8	6	6	17
AgriVisor (basic cash)	10	10	8	11	18	5	8	6	6	7
AgriVisor (basic hedge)	17	17	12	25	22	5	10	6	6	7
Allendale (futures & options)	N/A	22	27	10	13	28	8	20	18	29
Allendale (futures only)	12	22	19	14	13	20	8	25	16	31
Brock (cash only)	8	9	9	9	8	8	8	5	8	9
Brock (hedge)	31	28	38	41	46	11	30	8	27	34
Cash Grain	N/A	N/A	N/A	N/A	10	2	N/A	N/A	N/A	N/A
Co-Mark	N/A	N/A	N/A	N/A	N/A	14	19	28	5	N/A
Freese-Notis	14	12	10	8	17	21	6	19	16	11
Grain Field Marketing	N/A	N/A	N/A	N/A	N/A	N/A	18	60	21	21
Grain Field Report	35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grain Marketing Plus	N/A	N/A	N/A	N/A	N/A	29	14	6	N/A	N/A
Harris Weather/Elliott Advisory	6	14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
North American Ag	9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Northstar Commodity	N/A	N/A	N/A	N/A	N/A	N/A	22	13	17	14
Pro Farmer (cash only)	5	8	7	12	9	9	12	10	14	12
Pro Farmer (hedge)	11	11	18	24	26	26	18	32	14	17
Progressive Ag	N/A	19	13	8	7	23	18	14	19	46
Prosperous Farmer	31	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Risk Management Group (cash only)	N/A	N/A	N/A	N/A	7	12	15	11	15	14
Risk Management Group (futures & options)	N/A	N/A	N/A	N/A	33	33	28	29	21	12
Risk Management Group (options only)	N/A	N/A	N/A	N/A	43	35	36	43	12	18
Stewart-Peterson Advisory Reports	29	44	47	57	52	41	26	19	23	42
Stewart-Peterson Strictly Cash	17	20	19	18	16	5	N/A	N/A	N/A	N/A
Top Farmer Intelligence	19	37	35	46	51	31	33	24	37	52
Utterback Marketing Services	N/A	N/A	32	34	94	65	65	45	68	68
Zwicker Cycle Letter	29	17	12	30	N/A	N/A	N/A	N/A	N/A	N/A
Descriptive Statistics:										
Average	17	17	17	22	23	20	19	19	21	30
Median	16	16	13	15	16	18	15	14	16	17
Minimum	5	7	3	8	4	2	6	5	5	7
Maximum	35	44	47	57	94	65	65	60	68	119
Total for All Programs	416	448	430	495	587	549	524	512	541	799
Total for All Programs All Crop Years										5,301

Notes: A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest. The transaction count for an advisory program includes all cash, forward, futures, options and marketing loan recommendations for a given crop year. Entry and exit transactions for futures and options positions are counted separately since positions may be entered and exited in an incremental manner. N/A denotes "Not Applicable," since the indicated program did not exist or was not evaluated for the given crop year.

Table 3. Number of Recommended Transactions for 40 Market Advisory Programs, Soybeans, 1995-2004 Crop Years

	Number of Transactions									
Market Advisory Program	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Ag Alert for Ontario	N/A	13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Financial Strategies	N/A	N/A	N/A	N/A	N/A	N/A	28	17	52	98
Ag Market Professional (cash only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12
Ag Market Professional (hedge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	111
Ag Profit by Hjort	7	6	6	26	9	N/A	N/A	N/A	N/A	N/A
Ag Review	23	23	15	14	19	12	19	36	29	13
AgLine by Doane (cash only)	8	9	9	7	19	14	9	9	8	9
AgLine by Doane (hedge)	N/A	N/A	N/A	29	19	16	11	12	20	12
AgResource	6	13	18	29	19	62	40	23	51	50
Agri-Edge (cash only)	10	8	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Edge (hedge)	10	25	14	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Mark	37	6	9	21	25	15	N/A	N/A	N/A	N/A
AgriVisor (aggressive cash)	19	16	11	8	22	7	6	6	4	8
AgriVisor (aggressive hedge)	27	12	12	26	26	9	6	6	4	8
AgriVisor (basic cash)	7	8	7	8	22	7	7	6	4	8
AgriVisor (basic hedge)	19	14	12	20	26	9	7	6	4	8
Allendale (futures only)	10	17	5	10	8	18	8	18	31	16
Brock (cash-only)	7	8	7	7	11	6	4	5	6	8
Brock (hedge)	23	24	22	29	43	13	14	10	20	37
Cash Grain	N/A	N/A	N/A	N/A	9	1	N/A	N/A	N/A	N/A
Co-Mark	N/A	N/A	N/A	N/A	N/A	12	10	9	1	N/A
Freese-Notis	12	13	12	8	26	20	7	20	26	11
Grain Field Marketing	N/A	N/A	N/A	N/A	N/A	N/A	9	66	28	25
Grain Field Report	28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grain Marketing Plus	N/A	N/A	N/A	N/A	N/A	10	4	4	N/A	N/A
Harris Weather/Elliott Advisory	3	16	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
North American Ag	9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Northstar Commodity	N/A	N/A	N/A	N/A	N/A	N/A	16	19	7	18
Pro Farmer (cash only)	7	7	8	11	23	20	10	13	13	13
Pro Farmer (hedge)	7	18	14	20	41	25	19	33	23	15
Progressive Ag	N/A	15	10	13	9	30	21	36	29	35
Prosperous Farmer	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Risk Management Group (cash only)	N/A	N/A	N/A	N/A	8	5	2	16	6	14
Risk Management Group (futures & options)	N/A	N/A	N/A	N/A	34	17	12	30	22	20
Risk Management Group (options only)	N/A	N/A	N/A	N/A	30	13	12	22	22	14
Stewart-Peterson Advisory Reports	46	47	54	39	65	48	33	23	10	32
Stewart-Peterson Strictly Cash	16	20	20	18	20	3	N/A	N/A	N/A	N/A
Top Farmer Intelligence	24	27	28	45	53	42	29	27	43	56
Utterback Marketing Services	N/A	N/A	27	35	91	58	43	33	46	42
Zwicker Cycle Letter	22	14	6	24	N/A	N/A	N/A	N/A	N/A	N/A
Descriptive Statistics:										
Average	16	16	14	20	27	19	15	19	20	27
Median	12	14	12	20	22	14	11	18	20	15
Minimum	3	6	3	7	8	1	2	4	1	8
Maximum	46	47	54	45	91	62	43	66	52	111
Total for All Programs	399	379	329	447	677	492	386	505	509	693
Total for All Programs All Crop Years										4,816

Notes: A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest. The transaction count for an advisory program includes all cash, forward, futures, options and marketing loan recommendations for a given crop year. Entry and exit transactions for futures and options positions are counted separately since positions may be entered and exited in an incremental manner. N/A denotes "Not Applicable," since the indicated program did not exist or was not evaluated for the given crop year.

Table 4. Descriptive Statistics on the Number of Recommended Transactions for Individual Market Advisory Programs, Corn and Soybeans, 1995-2004 Crop Years

Market Advisory Program	Crop Years	Number of Corn Transactions			Number of Soybean Transactions		
		Average	Minimum	Maximum	Average	Minimum	Maximum
Ag Alert for Ontario	1995	24	24	24	13	13	13
Ag Financial Strategies	2001-2004	54	22	90	49	17	98
Ag Market Professional (cash only)	2004	15	15	15	12	12	12
Ag Market Professional (hedge)	2004	119	119	119	111	111	111
Ag Profit by Hjort	1995-1999	7	4	11	11	6	26
Ag Review	1995-2004	16	9	26	20	12	36
AgLine by Doane (cash only)	1995-2004	10	6	14	10	7	19
AgLine by Doane (hedge)	1996-2004	13	7	19	17	11	29
AgResource	1995-2004	34	12	65	31	6	62
Agri-Edge (cash only)	1995-2004	7	3	10	7	3	10
Agri-Edge (hedge)	1995-1997	17	13	20	16	10	25
Agri-Mark	1995-1997	16	7	28	19	6	37
AgriVisor (aggressive cash)	1995-2004	10	5	18	11	4	22
AgriVisor (aggressive hedge)	1995-2004	15	5	34	14	4	27
AgriVisor (basic cash)	1995-2004	9	5	18	8	4	22
AgriVisor (basic hedge)	1995-2004	13	5	25	13	4	26
Allendale (futures & options)	1996-2004	19	8	29	N/A	N/A	N/A
Allendale (futures only)	1995-2004	18	8	31	14	5	31
Brock (cash only)	1995-2004	8	5	9	7	4	11
Brock (hedge)	1995-2004	29	8	46	24	10	43
Cash Grain	1999-2000	6	2	10	5	1	9
Co-Mark	2000-2003	17	5	28	8	1	12
Freese-Notis	1995-2004	13	6	21	16	7	26
Grain Field Marketing	2001-2004	30	18	60	32	9	66
Grain Field Report	1995	35	35	35	28	28	28
Grain Marketing Plus	2000-2002	16	6	29	6	4	10
Harris Weather/Elliott Advisory	1995-1996	10	6	14	10	3	16
North American Ag	1995	9	9	9	9	9	9
Northstar Commodity	2001-2004	17	13	22	15	7	19
Pro Farmer (cash only)	1995-2004	10	5	14	13	7	23
Pro Farmer (hedge)	1995-2004	20	11	32	22	7	41
Progressive Ag	1996-2004	19	7	46	22	9	36
Prosperous Farmer	1995	31	31	31	12	12	12
Risk Management Group (cash only)	1999-2004	12	7	15	9	2	16
Risk Management Group (futures & options)	1999-2004	26	12	33	23	12	34
Risk Management Group (options only)	1999-2004	31	12	43	19	12	30
Stewart-Peterson Advisory Reports	1995-2004	38	19	57	40	10	65
Stewart-Peterson Strictly Cash	1995-2000	16	5	20	16	3	20
Top Farmer Intelligence	1995-2004	37	19	52	37	24	56
Utterback Marketing Services	1997-2004	59	32	94	47	27	91
Zwicker Cycle Letter	1995-1998	22	12	30	17	6	24
All Programs	1995-2004	20	2	119	19	1	111

Notes: A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest. The transaction count for an advisory program includes all cash, forward, futures, options and marketing loan recommendations for a given crop year. Entry and exit transactions for futures and options positions are counted separately since positions may be entered and exited in an incremental manner. N/A denotes "Not Applicable," since the indicated program did not exist or was not evaluated for the given crop year.

Table 5. Linear Model of Harvest Progress and Associated Loan Deficiency Payment (LDP), Corn, Central Illinois, 2004 Crop Year

Date	Harvest Progress Through Date	LDP on Date	Average LDP Through Date
	---%---	---$ per bushel---	---$ per bushel---
September 14, 2004	4	0.07	0.07
September 15, 2004	8	0.07	0.07
September 16, 2004	12	0.06	0.07
September 17, 2004	16	0.09	0.07
September 20, 2004	20	0.14	0.09
September 21, 2004	24	0.19	0.10
September 22, 2004	28	0.24	0.12
September 23, 2004	32	0.30	0.15
September 24, 2004	36	0.34	0.17
September 27, 2004	40	0.36	0.19
September 28, 2004	44	0.31	0.20
September 29, 2004	48	0.28	0.20
September 30, 2004	52	0.30	0.21
October 1, 2004	56	0.31	0.22
October 4, 2004	60	0.31	0.22
October 5, 2004	64	0.36	0.23
October 6, 2004	68	0.36	0.24
October 7, 2004	72	0.34	0.25
October 8, 2004	76	0.35	0.25
October 11, 2004	80	0.35	0.26
October 12, 2004	84	0.36	0.26
October 13, 2004	88	0.38	0.27
October 14, 2004	92	0.36	0.27
October 15, 2004	96	0.35	0.27
October 18, 2004	100	0.32	0.28

Table 6. Linear Model of Harvest Progress and Associated Loan Deficiency Payment (LDP), Soybeans, Central Illinois, 2004 Crop Year

Date	Harvest Progress Through Date	LDP on Date	Average LDP Through Date
	---%	---$ per bushel	---$ per bushel
September 15, 2004	4	0.00	0.00
September 16, 2004	8	0.00	0.00
September 17, 2004	12	0.00	0.00
September 20, 2004	16	0.00	0.00
September 21, 2004	20	0.00	0.00
September 22, 2004	24	0.00	0.00
September 23, 2004	28	0.00	0.00
September 24, 2004	32	0.04	0.01
September 27, 2004	36	0.23	0.03
September 28, 2004	40	0.17	0.04
September 29, 2004	44	0.12	0.05
September 30, 2004	48	0.09	0.05
October 1, 2004	52	0.18	0.06
October 4, 2004	56	0.13	0.07
October 5, 2004	60	0.25	0.08
October 6, 2004	64	0.26	0.09
October 7, 2004	68	0.20	0.10
October 8, 2004	72	0.20	0.10
October 11, 2004	76	0.20	0.11
October 12, 2004	80	0.18	0.11
October 13, 2004	84	0.37	0.12
October 14, 2004	88	0.37	0.14
October 15, 2004	92	0.31	0.14
October 18, 2004	96	0.24	0.15
October 19, 2004	100	0.26	0.15

Table 7. On-Farm and Commercial Storage Costs, Corn, 2004 Crop Year

Ending Date for Storage	On-Farm Variable Cost			On-Farm Fixed Cost	On-Farm Total Cost	Commercial Cost		
	Physical Storage and Shrinkage	Interest	Total			Physical Storage and Shrinkage	Interest	Total
				---¢ per bushel---				
October 31, 2004	8.6	0.4	9.0	14.6	23.6	17.4	0.4	17.8
November 30, 2004	8.8	1.4	10.2	14.6	24.8	17.4	1.4	18.8
December 31, 2004	9.0	2.4	11.4	14.6	26.0	17.4	2.4	19.8
January 31, 2005	9.1	3.5	12.6	14.6	27.2	19.4	3.5	22.8
February 28, 2005	9.3	4.4	13.7	14.6	28.3	21.4	4.4	25.8
March 31, 2005	9.5	5.5	15.0	14.6	29.6	23.4	5.5	28.8
April 30, 2005	9.7	6.5	16.2	14.6	30.8	25.4	6.5	31.8
May 31, 2005	9.9	7.5	17.4	14.6	32.0	27.4	7.5	34.9
June 30, 2005	10.1	7.6	17.6	14.6	32.2	29.4	7.6	36.9
July 31, 2005	10.2	7.6	17.8	14.6	32.4	31.4	7.6	38.9
August 31, 2005	10.4	7.6	18.0	14.6	32.6	33.4	7.6	40.9

Note: Estimates of the on-farm variable and fixed costs of physical storage are drawn from a study conducted at Kansas State University (Dhuyvetter, Hamman and Harner, 2000). The estimates assume storage occurs in a 25,000 bushel round metal bin. The first component of on-farm physical storage is a flat charge of 6.7 cents per bushel for conveyance, aeration, insecticide and repairs. The second component of on-farm physical storage is shrinkage. Corn shrinkage is assumed in the Kansas State University study to start at one-percent per bushel for the first month of storage and increase at a rate of one-tenth of one percent for each month stored thereafter. The cost of shrink is based on the harvest price. Commercial storage costs are drawn from an informal telephone survey of nine central Illinois elevators. Interest opportunity costs are the same for on-farm and commercial storage, and are computed as the harvest price times the interest rate compounded daily from the end of harvest to the date of sale. The interest rate is the average rate for all other farm operating loans for Seventh Federal Reserve District agricultural banks in the fourth quarter of 2004 as reported in the Agricultural Finance Databook.

Table 8. On-Farm and Commercial Storage Costs, Soybeans, 2004 Crop Year

Ending Date for Storage	On-Farm Variable Cost			On-Farm Fixed Cost	On-Farm Total Cost	Commercial Cost		
	Physical Storage and Shrinkage	Interest	Total			Physical Storage	Interest	Total
				---¢ per bushel---				
October 31, 2004	8.0	1.1	9.0	14.6	23.6	13.0	1.1	14.1
November 30, 2004	8.0	3.8	11.8	14.6	26.4	13.0	3.8	16.8
December 31, 2004	8.0	6.6	14.6	14.6	29.2	13.0	6.6	19.6
January 31, 2005	8.0	9.5	17.5	14.6	32.1	15.0	9.5	24.5
February 28, 2005	8.0	12.1	20.0	14.6	34.6	17.0	12.1	29.1
March 31, 2005	8.0	15.0	22.9	14.6	37.5	19.0	15.0	34.0
April 30, 2005	8.0	17.8	25.7	14.6	40.3	21.0	17.8	38.8
May 31, 2005	8.0	20.7	28.6	14.6	43.2	23.0	20.7	43.7
June 30, 2005	8.0	23.5	31.5	14.6	46.1	25.0	23.5	48.5
July 31, 2005	8.0	26.5	34.4	14.6	49.0	27.0	26.5	53.5
August 31, 2005	8.0	29.4	37.4	14.6	52.0	29.0	29.4	58.4

Note: Estimates of the on-farm variable and fixed costs of physical storage are drawn from a study conducted at Kansas State University (Dhuyvetter, Hamman and Harner, 2000). The estimates assume storage occurs in a 25,000 bushel round metal bin. The first component of on-farm physical storage is a flat charge of 6.7 cents per bushel for conveyance, aeration, insecticide and repairs. The second component of on-farm physical storage is shrinkage. Since the Kansas State study did not estimate shrinkage costs for soybeans, agricultural engineering specialists at the University of Illinois and Purdue University were consulted. The resulting estimate for soybeans is a constant 0.25 percent shrink factor. The cost of shrink is based on the harvest price. Commercial storage costs are drawn from an informal telephone survey of nine central Illinois elevators. Interest opportunity costs are the same for on-farm and commercial storage, and are computed as the harvest price times the interest rate compounded daily from the end of harvest to the date of sale. The interest rate is the average rate for all other farm operating loans for Seventh Federal Reserve District agricultural banks in the fourth quarter of 2004 as reported in the Agricultural Finance Databook.

Table 9. Pricing Results for 27 Market Advisory Programs, Corn, 2004 Crop Year, On-Farm Variable Storage Costs

Market Advisory Program	(1) Unadjusted Cash Sales Price	(2) On-Farm Variable Storage Costs: Physical Storage	(3) On-Farm Variable Storage Costs: Shrinkage	(4) On-Farm Variable Storage Costs: Interest	(5) Net Cash Sales Price	(6) Futures & Options Gain	(7) Brokerage Costs	(8) LDP / MLG	(9) Net Advisory Price
				---$ per bushel---					
Ag Financial Strategies	1.92	0.07	0.03	0.05	1.77	0.46	0.17	0.29	**2.36**
Ag Market Professional (cash only)	2.20	0.04	0.02	0.04	2.10	0.00	0.00	0.20	**2.29**
Ag Market Professional (hedge)	2.24	0.05	0.02	0.05	2.12	-0.07	0.17	0.23	**2.11**
Ag Review	2.16	0.03	0.01	0.02	2.10	0.16	0.02	0.27	**2.51**
AgLine by Doane (cash only)	2.20	0.04	0.02	0.03	2.11	0.00	0.00	0.26	**2.37**
AgLine by Doane (hedge)	2.20	0.04	0.02	0.03	2.11	-0.04	0.00	0.26	**2.33**
AgResource	2.06	0.07	0.02	0.03	1.94	0.53	0.07	0.33	**2.74**
AgriVisor (aggressive cash)	2.30	0.04	0.02	0.04	2.21	0.00	0.00	0.27	**2.47**
AgriVisor (aggressive hedge)	2.30	0.04	0.02	0.04	2.21	0.11	0.01	0.27	**2.57**
AgriVisor (basic cash)	2.30	0.04	0.02	0.04	2.21	0.00	0.00	0.27	**2.47**
AgriVisor (basic hedge)	2.30	0.04	0.02	0.04	2.21	0.00	0.00	0.27	**2.47**
Allendale (futures & options)	2.02	0.07	0.03	0.05	1.88	0.33	0.05	0.36	**2.51**
Allendale (futures only)	2.02	0.07	0.03	0.05	1.88	0.26	0.06	0.36	**2.43**
Brock (cash-only)	2.24	0.03	0.02	0.04	2.16	0.00	0.00	0.17	**2.33**
Brock (hedge)	2.25	0.03	0.02	0.04	2.16	-0.03	0.03	0.17	**2.27**
Freese-Notis	2.15	0.05	0.02	0.01	2.08	0.04	0.00	0.24	**2.35**
Grain Field Marketing	2.17	0.04	0.02	0.03	2.08	0.00	0.01	0.27	**2.34**
Northstar Commodity	2.14	0.04	0.02	0.05	2.03	-0.02	0.00	0.34	**2.35**
Pro Farmer (cash only)	2.06	0.05	0.02	0.04	1.96	0.00	0.00	0.19	**2.15**
Pro Farmer (hedge)	2.06	0.05	0.02	0.04	1.96	0.01	0.00	0.27	**2.23**
Progressive Ag	2.31	0.07	0.03	0.05	2.16	0.44	0.05	0.32	**2.87**
Risk Management Group (cash only)	2.19	0.05	0.02	0.04	2.08	0.00	0.00	0.11	**2.19**
Risk Management Group (futures & options)	2.16	0.05	0.02	0.05	2.05	-0.01	0.00	0.11	**2.14**
Risk Management Group (options only)	2.16	0.05	0.02	0.05	2.05	0.12	0.01	0.11	**2.26**
Stewart-Peterson Advisory Reports	2.23	0.04	0.02	0.04	2.13	0.24	0.05	0.25	**2.57**
Top Farmer Intelligence	2.16	0.04	0.01	0.02	2.10	-0.02	0.03	0.29	**2.34**
Utterback Marketing Services	2.43	0.04	0.02	0.04	2.33	0.24	0.10	0.28	**2.75**
Descriptive Statistics:									
Average	2.18	0.05	0.02	0.04	2.08	0.10	0.03	0.25	**2.40**
Median	2.19	0.04	0.02	0.04	2.10	0.00	0.01	0.27	**2.35**
Minimum	1.92	0.03	0.01	0.01	1.77	-0.07	0.00	0.11	**2.11**
Maximum	2.43	0.07	0.03	0.05	2.33	0.53	0.17	0.36	**2.87**
Range	0.51	0.03	0.02	0.04	0.56	0.61	0.17	0.25	**0.75**
Standard Deviation	0.11	0.01	0.00	0.01	0.12	0.17	0.05	0.07	**0.19**
Market Benchmarks									
24-month average	2.16	0.03	0.01	0.03	2.09	0.00	0.00	0.17	**2.26**
20-month average	2.16	0.04	0.02	0.03	2.07	0.00	0.00	0.16	**2.23**
Farmer Benchmarks									
USDA average price received	2.14	0.06	0.02	0.04	2.02	0.00	0.00	0.27	**2.29**
Market Prices	1.92	0.06	0.02	0.04	1.80	0.00	0.00	0.27	**2.06**

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. Market and farmer benchmark prices also are stated on a harvest equivalent basis. LDP stands for loan deficiency payment and MLG stands for marketing loan gain. The 2004 crop year is a two-year marketing window from September 2003 through August 2005.

Table 10. Pricing Results for 26 Market Advisory Programs, Soybeans, 2004 Crop Year, On-Farm Variable Storage Costs

Market Advisory Program	(1) Unadjusted Cash Sales Price	(2) On-Farm Variable Storage Costs: Physical Storage	(3) On-Farm Variable Storage Costs: Shrinkage	(4) On-Farm Variable Storage Costs: Interest	(5) Net Cash Sales Price	(6) Futures & Options Gain	(7) Brokerage Costs	(8) LDP / MLG	(9) Net Advisory Price
				---$ per bushel---					
Ag Financial Strategies	5.94	0.05	0.01	0.08	5.80	-0.01	0.16	0.20	**5.83**
Ag Market Professional (cash only)	6.17	0.04	0.01	0.07	6.06	0.00	0.00	0.11	**6.16**
Ag Market Professional (hedge)	6.22	0.04	0.01	0.08	6.10	0.20	0.19	0.09	**6.20**
Ag Review	5.94	0.04	0.01	0.06	5.84	0.38	0.01	0.02	**6.23**
AgLine by Doane (cash only)	6.03	0.05	0.01	0.08	5.90	0.00	0.00	0.04	**5.94**
AgLine by Doane (hedge)	6.23	0.04	0.01	0.07	6.12	-0.04	0.00	0.06	**6.14**
AgResource	5.96	0.05	0.01	0.05	5.85	1.66	0.09	0.06	**7.49**
AgriVisor (aggressive cash)	6.25	0.04	0.01	0.07	6.13	0.00	0.00	0.17	**6.30**
AgriVisor (aggressive hedge)	6.25	0.04	0.01	0.07	6.13	0.00	0.00	0.17	**6.30**
AgriVisor (basic cash)	6.25	0.04	0.01	0.07	6.13	0.00	0.00	0.17	**6.30**
AgriVisor (basic hedge)	6.25	0.04	0.01	0.07	6.13	0.00	0.00	0.17	**6.30**
Allendale (futures only)	5.20	0.07	0.01	0.01	5.11	0.50	0.03	0.00	**5.58**
Brock (cash only)	6.16	0.02	0.00	0.04	6.09	0.00	0.00	0.06	**6.15**
Brock (hedge)	6.11	0.02	0.00	0.04	6.03	0.06	0.04	0.06	**6.11**
Freese-Notis	5.75	0.03	0.01	0.00	5.71	0.09	0.01	0.08	**5.88**
Grain Field Marketing	5.76	0.03	0.01	0.03	5.69	-0.11	0.02	0.09	**5.65**
Northstar Commodity	5.90	0.04	0.01	0.08	5.77	0.31	0.01	0.25	**6.32**
Pro Farmer (cash only)	5.94	0.05	0.01	0.08	5.81	0.00	0.00	0.04	**5.85**
Pro Farmer (hedge)	5.94	0.05	0.01	0.08	5.81	0.03	0.00	0.04	**5.88**
Progressive Ag	6.42	0.07	0.01	0.01	6.34	0.21	0.04	0.20	**6.71**
Risk Management Group (cash only)	5.98	0.04	0.01	0.04	5.89	0.00	0.00	0.12	**6.01**
Risk Management Group (futures & options)	6.14	0.04	0.01	0.04	6.05	-0.04	0.02	0.04	**6.04**
Risk Management Group (options only)	5.88	0.05	0.01	0.05	5.76	0.12	0.01	0.00	**5.87**
Stewart-Peterson Advisory Reports	5.88	0.03	0.01	0.03	5.81	0.32	0.03	0.05	**6.15**
Top Farmer Intelligence	5.92	0.02	0.00	0.02	5.87	-0.04	0.04	0.15	**5.93**
Utterback Marketing Services	5.03	0.05	0.01	0.09	4.88	1.13	0.13	0.15	**6.03**
Descriptive Statistics:									
Average	5.98	0.04	0.01	0.05	5.88	0.18	0.03	0.10	**6.13**
Median	5.97	0.04	0.01	0.06	5.88	0.00	0.01	0.08	**6.12**
Minimum	5.03	0.02	0.00	0.00	4.88	-0.11	0.00	0.00	**5.58**
Maximum	6.42	0.07	0.01	0.09	6.34	1.66	0.19	0.25	**7.49**
Range	1.39	0.04	0.01	0.09	1.46	1.78	0.19	0.25	**1.91**
Standard Deviation	0.31	0.01	0.00	0.03	0.31	0.40	0.05	0.07	**0.37**
Market Benchmarks									
24-Month Average	6.02	0.03	0.01	0.07	5.91	0.00	0.00	0.04	**5.95**
20-Month Average	6.11	0.04	0.01	0.08	5.98	0.00	0.00	0.03	**6.02**
Farmer Benchmark									
USDA Average Price Received	5.83	0.06	0.01	0.10	5.66	0.00	0.00	0.11	**5.77**
Market Prices	5.64	0.06	0.01	0.10	5.46	0.00	0.00	0.11	**5.57**

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. Market and farmer benchmark prices also are stated on a harvest equivalent basis. LDP stands for loan deficiency payment and MLG stands for marketing loan gain. The 2004 crop year is a two-year marketing window from September 2003 through August 2005.

Table 11. Revenue Results for 26 Market Advisory Programs, Corn and Soybeans, 50/50 Advisory Revenue 2004 Crop Year, On-Farm Variable Storage Costs

	(1)	(2)	(3)	(4)
	Advisory Revenue			Annual
Market Advisory Program	Corn	Soybeans	50/50 Advisory Revenue	Cost of Service
	---$ per acre (harvest equivalent)---			---$ per year---
Ag Financial Strategies	439	315	**377**	399
Ag Market Professional (cash only)	427	333	**380**	1,000
Ag Market Professional (hedge)	393	335	**364**	1,000
Ag Review	466	337	**401**	400
AgLine by Doane (cash only)	441	321	**381**	129
AgLine by Doane (hedge)	433	331	**382**	129
AgResource	510	404	**457**	550
AgriVisor (aggressive cash)	460	340	**400**	235
AgriVisor (aggressive hedge)	479	340	**409**	235
AgriVisor (basic cash)	460	340	**400**	235
AgriVisor (basic hedge)	460	340	**400**	235
Allendale (futures only)	468	302	**385**	360
Brock (cash-only)	433	332	**383**	545
Brock (hedge)	423	330	**376**	545
Freese-Notis	438	317	**378**	300
Grain Field Marketing	436	305	**370**	200
Northstar Commodity	437	341	**389**	485
Pro Farmer (cash only)	399	316	**357**	468
Pro Farmer (hedge)	415	317	**366**	468
Progressive Ag	534	362	**448**	300
Risk Management Group (cash only)	408	325	**366**	500
Risk Management Group (futures & options)	398	326	**362**	500
Risk Management Group (options only)	421	317	**369**	500
Stewart-Peterson Advisory Reports	479	332	**405**	180
Top Farmer Intelligence	435	320	**377**	180
Utterback Marketing Services	512	326	**419**	300
Descriptive Statistics:				
Average	446	331	**389**	399
Median	437	331	**381**	380
Minimum	393	302	**357**	129
Maximum	534	404	**457**	1,000
Range	140	103	**100**	871
Standard Deviation	36	20	**25**	224
Market Benchmarks				
24-month average	420	321	**371**	
20-month average	415	325	**370**	
Farmer Benchmarks				
USDA average price received	426	312	**369**	
Market Prices	383	301	**342**	

Notes: Advisory revenue per acre for corn (soybeans) is calculated as net advisory price times 186 (54) bushels. Market or farmer benchmark revenue per acre for corn (soybeans) is calculated as the benchmark price times 186 (54) bushels. 50/50 advisory revenue is calculated as (1) x 0.5 + (2) x 0.5. Advisory revenue per acre and benchmark revenue are stated on a harvest equivalent basis. The annual cost of a service is not subtracted from advisory revenue per acre. The 2004 crop year is a two-year marketing window from September 2003 through August 2005.

Table 12. Pricing Results for 27 Market Advisory Programs, Corn, 2004 Crop Year, Commercial Storage Costs

Market Advisory Program	(1) Unadjusted Cash Sales Price	(2) Commercial Storage Costs: Physical Storage	(3) Commercial Storage Costs: Shrinkage	(4) Commercial Storage Costs: Interest	(5) Net Cash Sales Price	(6) Futures & Options Gain	(7) Brokerage Costs	(8) LDP / MLG	(9) Net Advisory Price
					---$/bushel---				
Ag Financial Strategies	1.92	0.19	0.04	0.05	1.64	0.46	0.17	0.29	**2.22**
Ag Market Professional (cash only)	2.20	0.15	0.03	0.04	1.99	0.00	0.00	0.20	**2.18**
Ag Market Professional (hedge)	2.21	0.17	0.03	0.05	1.96	-0.07	0.17	0.23	**1.96**
Ag Review	2.16	0.07	0.02	0.02	2.05	0.16	0.02	0.27	**2.46**
AgLine by Doane (cash only)	2.20	0.11	0.02	0.03	2.04	0.00	0.00	0.26	**2.29**
AgLine by Doane (hedge)	2.20	0.11	0.02	0.03	2.04	-0.04	0.00	0.26	**2.25**
AgResource	2.06	0.14	0.04	0.03	1.85	0.53	0.07	0.33	**2.65**
AgriVisor (aggressive cash)	2.30	0.12	0.02	0.04	2.12	0.00	0.00	0.27	**2.39**
AgriVisor (aggressive hedge)	2.30	0.12	0.02	0.04	2.12	0.11	0.01	0.27	**2.48**
AgriVisor (basic cash)	2.30	0.12	0.02	0.04	2.12	0.00	0.00	0.27	**2.39**
AgriVisor (basic hedge)	2.30	0.12	0.02	0.04	2.12	0.00	0.00	0.27	**2.39**
Allendale (futures & options)	2.02	0.19	0.04	0.05	1.74	0.33	0.05	0.36	**2.37**
Allendale (futures only)	2.02	0.19	0.04	0.05	1.74	0.26	0.06	0.36	**2.29**
Brock (cash only)	2.24	0.11	0.02	0.04	2.08	0.00	0.00	0.17	**2.24**
Brock (hedge)	2.25	0.11	0.02	0.04	2.08	-0.03	0.03	0.17	**2.19**
Freese-Notis	2.15	0.10	0.03	0.01	2.01	0.04	0.00	0.24	**2.29**
Grain Field Marketing	2.17	0.12	0.03	0.04	1.99	0.00	0.01	0.27	**2.25**
Northstar Commodity	2.14	0.15	0.03	0.05	1.91	-0.02	0.00	0.34	**2.23**
Pro Farmer (cash only)	2.06	0.14	0.03	0.04	1.85	0.00	0.00	0.19	**2.03**
Pro Farmer (hedge)	2.06	0.14	0.03	0.04	1.85	0.01	0.00	0.27	**2.12**
Progressive Ag	2.29	0.13	0.04	0.02	2.10	0.33	0.05	0.32	**2.70**
Risk Management Group (cash only)	2.19	0.14	0.03	0.04	1.98	0.00	0.00	0.11	**2.09**
Risk Management Group (futures & option	2.16	0.15	0.03	0.05	1.94	-0.01	0.00	0.11	**2.03**
Risk Management Group (options only)	2.16	0.15	0.03	0.05	1.94	0.12	0.01	0.11	**2.15**
Stewart-Peterson Advisory Reports	2.23	0.14	0.02	0.05	2.02	0.24	0.05	0.25	**2.46**
Top Farmer Intelligence	2.16	0.09	0.02	0.02	2.03	-0.02	0.03	0.29	**2.27**
Utterback Marketing Services	2.43	0.14	0.02	0.05	2.21	0.24	0.10	0.28	**2.64**
Descriptive Statistics:									
Average	2.18	0.13	0.03	0.04	1.98	0.10	0.03	0.25	**2.30**
Median	2.19	0.14	0.03	0.04	2.01	0.00	0.01	0.27	**2.27**
Minimum	1.92	0.07	0.02	0.01	1.64	-0.07	0.00	0.11	**1.96**
Maximum	2.43	0.19	0.04	0.05	2.21	0.53	0.17	0.36	**2.70**
Range	0.51	0.11	0.02	0.04	0.58	0.60	0.17	0.25	**0.74**
Standard Deviation	0.11	0.03	0.01	0.01	0.14	0.16	0.05	0.07	**0.19**
Market Benchmarks									
24-month average	2.16	0.10	0.02	0.03	2.02	0.00	0.00	0.17	**2.19**
20-month average	2.16	0.11	0.02	0.03	1.99	0.00	0.00	0.16	**2.15**
Farmer Benchmarks									
USDA prices	2.14	0.16	0.04	0.04	1.91	0.00	0.00	0.27	**2.17**
Market Prices	1.92	0.16	0.04	0.04	1.68	0.00	0.00	0.27	**1.95**

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. Market and farmer benchmark prices also are stated on a harvest equivalent basis. LDP stands for loan deficiency payment and MLG stands for marketing loan gain. The 2004 crop year is a two-year marketing window from September 2003 through August 2005.

Table 13. Pricing Results for 26 Market Advisory Programs, Soybeans, 2004 Crop Year, Commercial Storage

Market Advisory Program	(1) Unadjusted Cash Sales Price	(2) Commercial Storage Costs: Physical Storage	(3) Commercial Storage Costs: Interest	(4) Net Cash Sales Price	(5) Futures & Options Gain	(6) Brokerage Costs	(7) LDP / MLG	(8) Net Advisory Price
				---$ per bushel---				
Ag Financial Strategies	5.94	0.13	0.08	5.73	-0.01	0.16	0.20	**5.77**
Ag Market Professional (cash only)	6.17	0.10	0.07	6.00	0.00	0.00	0.11	**6.11**
Ag Market Professional (hedge)	6.22	0.10	0.08	6.04	0.20	0.19	0.09	**6.14**
Ag Review	5.94	0.09	0.06	5.79	0.38	0.01	0.02	**6.18**
AgLine by Doane (cash only)	6.03	0.12	0.08	5.83	0.00	0.00	0.04	**5.87**
AgLine by Doane (hedge)	6.23	0.10	0.07	6.07	-0.04	0.00	0.06	**6.08**
AgResource	5.96	0.10	0.05	5.81	1.66	0.09	0.06	**7.45**
AgriVisor (aggressive cash)	6.25	0.10	0.07	6.07	0.00	0.00	0.17	**6.24**
AgriVisor (aggressive hedge)	6.25	0.10	0.07	6.07	0.00	0.00	0.17	**6.24**
AgriVisor (basic cash)	6.25	0.10	0.07	6.07	0.00	0.00	0.17	**6.24**
AgriVisor (basic hedge)	6.25	0.10	0.07	6.07	0.00	0.00	0.17	**6.24**
Allendale (futures only)	5.20	0.13	0.01	5.06	0.50	0.03	0.00	**5.53**
Brock (cash only)	6.16	0.06	0.04	6.06	0.00	0.00	0.06	**6.12**
Brock (hedge)	6.11	0.06	0.04	6.00	0.06	0.04	0.06	**6.08**
Freese-Notis	5.75	0.06	0.00	5.69	0.09	0.01	0.08	**5.85**
Grain Field Marketing	5.76	0.06	0.03	5.67	-0.11	0.02	0.09	**5.62**
Northstar Commodity	5.90	0.11	0.08	5.72	0.31	0.01	0.25	**6.26**
Pro Farmer (cash only)	5.94	0.12	0.08	5.74	0.00	0.00	0.04	**5.78**
Pro Farmer (hedge)	5.94	0.12	0.08	5.74	0.03	0.00	0.04	**5.81**
Progressive Ag	6.42	0.13	0.01	6.29	0.21	0.04	0.20	**6.66**
Risk Management Group (cash only)	5.98	0.10	0.04	5.85	0.00	0.00	0.12	**5.97**
Risk Management Group (futures & options)	6.14	0.08	0.04	6.01	-0.04	0.02	0.04	**6.00**
Risk Management Group (options only)	5.88	0.11	0.05	5.71	0.12	0.01	0.00	**5.82**
Stewart-Peterson Advisory Reports	5.88	0.06	0.03	5.79	0.32	0.03	0.05	**6.12**
Top Farmer Intelligence	5.92	0.05	0.02	5.85	-0.04	0.04	0.15	**5.91**
Utterback Marketing Services	5.03	0.19	0.18	4.67	1.13	0.13	0.15	**5.82**
Descriptive Statistics:								
Average	5.98	0.10	0.06	5.82	0.18	0.03	0.10	**6.07**
Median	5.97	0.10	0.07	5.84	0.00	0.01	0.08	**6.08**
Minimum	5.03	0.05	0.00	4.67	-0.11	0.00	0.00	**5.53**
Maximum	6.42	0.19	0.18	6.29	1.66	0.19	0.25	**7.45**
Range	1.39	0.14	0.18	1.62	1.78	0.19	0.25	**1.92**
Standard Deviation	0.31	0.03	0.03	0.33	0.40	0.05	0.07	**0.37**
Market Benchmarks								
24-Month Average	6.02	0.09	0.07	5.86	0.00	0.00	0.04	**5.90**
20-Month Average	6.11	0.11	0.08	5.92	0.00	0.00	0.03	**5.95**
Farmer Benchmark								
USDA prices	5.83	0.15	0.10	5.58	0.00	0.00	0.11	**5.69**
Market Prices	5.64	0.15	0.10	5.38	0.00	0.00	0.11	**5.49**

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. Market and farmer benchmark prices also are stated on a harvest equivalent basis. LDP stands for loan deficiency payment and MLG stands for marketing loan gain. The 2004 crop year is a two-year marketing window from September 2003 through August 2005.

Table 14. Revenue Results for 26 Market Advisory Programs, Corn and Soybeans, 50/50 Advisory Revenue, 2004 Crop Year, Commercial Storage Costs

Market Advisory Program	(1) Advisory Revenue Corn	(2) Advisory Revenue Soybeans	(3) 50/50 Advisory Revenue	(4) Annual Cost of Service
	---$ per acre (harvest equivalent)---			---$ per year---
Ag Financial Strategies	414	311	**363**	399
Ag Market Professional (cash only)	406	330	**368**	1,000
Ag Market Professional (hedge)	364	332	**348**	1,000
Ag Review	457	334	**395**	400
AgLine by Doane (cash only)	426	317	**372**	129
AgLine by Doane (hedge)	418	329	**373**	129
AgResource	493	402	**448**	550
AgriVisor (aggressive cash)	444	337	**390**	235
AgriVisor (aggressive hedge)	462	337	**400**	235
AgriVisor (basic cash)	444	337	**390**	235
AgriVisor (basic hedge)	444	337	**390**	235
Allendale (futures only)	426	299	**362**	360
Brock (cash-only)	417	330	**374**	545
Brock (hedge)	407	328	**368**	545
Freese-Notis	426	316	**371**	300
Grain Field Marketing	419	303	**361**	200
Northstar Commodity	416	338	**377**	485
Pro Farmer (cash only)	378	312	**345**	468
Pro Farmer (hedge)	395	314	**354**	468
Progressive Ag	501	360	**431**	300
Risk Management Group (cash only)	389	322	**356**	500
Risk Management Group (futures & options)	378	324	**351**	500
Risk Management Group (options only)	401	315	**358**	500
Stewart-Peterson Advisory Reports	458	331	**395**	180
Top Farmer Intelligence	423	319	**371**	180
Utterback Marketing Services	491	314	**403**	300
Descriptive Statistics:				
Average	427	328	**377**	399
Median	421	328	**371**	380
Minimum	364	299	**345**	129
Maximum	501	402	**448**	1,000
Range	138	104	**102**	871
Standard Deviation	35	20	**25**	224
Market Benchmarks				
24-month average	407	319	**363**	
20-month average	400	322	**361**	
Farmer Benchmarks				
USDA prices	404	307	**356**	
Market Prices	362	296	**329**	

Notes: Advisory revenue per acre for corn (soybeans) is calculated as net advisory price times 186 (54) bushels. Market or farmer benchmark revenue per acre for corn (soybeans) is calculated as the benchmark price times 186 (54) bushels. 50/50 advisory revenue is calculated as (1) x 0.5 + (2) x 0.5. Advisory revenue per acre and benchmark revenue are stated on a harvest equivalent basis. The annual cost of a service is not subtracted from advisory revenue per acre. The 2004 crop year is a two-year marketing window from September 2003 through August 2005.

Table 15. Pricing Results for 41 Market Advisory Programs, Corn, 2000-2004 Crop Years, On-Farm Variable Storage Costs

Market Advisory Program	2000 Net Advisory Price	2001 Net Advisory Price	2002 Net Advisory Price	2003 Net Advisory Price	2004 Net Advisory Price	2003-04 Two-Year Average	2002-04 Three-Year Average	2001-04 Four-Year Average	2000-04 Five-Year Average
				---$ per bushel (harvest equivalent)---					
Ag Alert for Ontario	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Financial Strategies	N/A	1.91	1.85	2.07	2.36	2.21	2.09	2.05	N/A
Ag Market Professional (cash only)	N/A	N/A	N/A	N/A	2.29	N/A	N/A	N/A	N/A
Ag Market Professional (hedge)	N/A	N/A	N/A	N/A	2.11	N/A	N/A	N/A	N/A
Ag Profit by Hjort	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Review	2.14	2.29	2.46	2.40	2.51	2.45	2.46	2.41	2.36
AgLine by Doane (cash only)	2.24	2.04	2.11	2.48	2.37	2.42	2.32	2.25	2.25
AgLine by Doane (hedge)	2.32	2.06	2.11	2.45	2.33	2.39	2.30	2.24	2.25
AgResource	2.90	1.78	2.33	2.70	2.74	2.72	2.59	2.39	2.49
Agri-Edge (cash only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Edge (hedge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Mark	2.19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AgriVisor (aggressive cash)	2.28	2.08	2.37	2.27	2.47	2.37	2.37	2.30	2.29
AgriVisor (aggressive hedge)	2.28	2.08	2.37	2.27	2.57	2.42	2.40	2.32	2.31
AgriVisor (basic cash)	2.26	2.06	2.37	2.27	2.47	2.37	2.37	2.29	2.29
AgriVisor (basic hedge)	2.26	2.03	2.37	2.27	2.47	2.37	2.37	2.28	2.28
Allendale (futures & options)	2.03	2.07	2.06	2.30	2.51	2.41	2.29	2.24	2.19
Allendale (futures only)	2.29	2.09	2.13	2.28	2.43	2.36	2.28	2.23	2.24
Brock (cash only)	2.10	2.02	2.46	2.35	2.33	2.34	2.38	2.29	2.25
Brock (hedge)	2.38	2.01	2.45	2.31	2.27	2.29	2.35	2.26	2.29
Cash Grain	2.14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Co-Mark	2.10	2.12	2.11	2.29	N/A	N/A	N/A	N/A	N/A
Freese-Notis	2.21	1.98	2.21	2.35	2.35	2.35	2.31	2.23	2.22
Grain Field Marketing	N/A	2.18	2.12	2.27	2.34	2.31	2.25	2.23	2.23
Grain Field Report	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grain Marketing Plus	1.91	2.12	2.05	N/A	N/A	N/A	N/A	N/A	N/A
Harris Weather/Elliott Advisory	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
North American Ag	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Northstar Commodity	N/A	2.05	2.14	2.41	2.35	2.38	2.30	2.24	N/A
Pro Farmer (cash only)	2.06	2.08	2.13	2.22	2.15	2.18	2.17	2.14	2.13
Pro Farmer (hedge)	1.94	1.99	1.94	2.13	2.23	2.18	2.10	2.07	2.05
Progressive Ag	2.20	2.68	2.28	2.56	2.87	2.72	2.57	2.60	2.52
Prosperous Farmer	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Risk Management Group (cash only)	2.28	2.15	2.20	2.23	2.19	2.21	2.21	2.19	2.21
Risk Management Group (futures & options)	2.25	2.10	2.37	2.29	2.14	2.21	2.27	2.22	2.23
Risk Management Group (options only)	2.23	2.10	2.21	2.27	2.26	2.27	2.25	2.21	2.22
Stewart-Peterson Advisory Reports	1.90	2.11	2.15	2.24	2.57	2.41	2.32	2.27	2.20
Stewart-Peterson Strictly Cash	2.05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Farmer Intelligence	2.45	2.27	2.07	2.19	2.34	2.26	2.20	2.22	2.26
Utterback Marketing Services	2.39	2.11	2.18	2.07	2.75	2.41	2.34	2.28	2.30
Zwicker Cycle Letter	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Descriptive Statistics:									
Average	2.21	2.09	2.21	2.31	2.40	2.36	2.31	2.26	2.26
Median	2.23	2.08	2.18	2.28	2.35	2.37	2.31	2.24	2.25
Minimum	1.90	1.78	1.85	2.07	2.11	2.18	2.09	2.05	2.05
Maximum	2.90	2.68	2.46	2.70	2.87	2.72	2.59	2.60	2.52
Range	1.00	0.90	0.61	0.63	0.75	0.54	0.50	0.55	0.47
Standard Deviation	0.20	0.15	0.16	0.14	0.19	0.13	0.12	0.11	0.10
Market Benchmarks									
24-month average	2.15	2.07	2.16	2.30	2.26	2.28	2.24	2.20	2.19
20-month average	2.09	2.02	2.16	2.31	2.23	2.27	2.23	2.18	2.16
Farmer Benchmarks									
USDA average price received	2.06	2.07	2.22	2.31	2.29	2.30	2.27	2.22	2.19
Market Prices	2.04	2.03	2.19	2.35	2.06	2.21	2.20	2.16	2.13

Notes: Net advisory prices and benchmark prices are stated on a harvest equivalent basis. A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest. N/A denotes "Not Applicable," since the indicated program did not exist or was not evaluated for the given crop year.

Table 16. Pricing Results for 40 Market Advisory Programs, Soybeans, 2000-2004 Crop Years, On-Farm Variable Storage Costs

Market Advisory Program	2000 Net Advisory Price	2001 Net Advisory Price	2002 Net Advisory Price	2003 Net Advisory Price	2004 Net Advisory Price	2003-04 Two-Year Average	2002-04 Three-Year Average	2001-04 Four-Year Average	2000-04 Five-Year Average
				---$ per bushel (harvest equivalent)---					
Ag Alert for Ontario	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Financial Strategies	N/A	5.36	4.80	5.98	5.83	5.90	5.54	5.49	N/A
Ag Market Professional (cash only)	N/A	N/A	N/A	N/A	6.16	N/A	N/A	N/A	N/A
Ag Market Professional (hedge)	N/A	N/A	N/A	N/A	6.20	N/A	N/A	N/A	N/A
Ag Profit by Hjort	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Review	5.35	5.40	5.35	3.70	6.23	4.96	5.09	5.17	5.21
AgLine by Doane (cash only)	5.50	5.47	5.41	6.51	5.94	6.22	5.95	5.83	5.77
AgLine by Doane (hedge)	5.33	5.41	5.51	6.45	6.14	6.29	6.03	5.88	5.77
AgResource	6.88	5.77	5.24	6.49	7.49	6.99	6.41	6.25	6.38
Agri-Edge (cash only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Edge (hedge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Mark	5.66	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AgriVisor (aggressive cash)	5.41	5.55	5.30	6.82	6.30	6.56	6.14	5.99	5.88
AgriVisor (aggressive hedge)	5.34	5.55	5.30	6.82	6.30	6.56	6.14	5.99	5.86
AgriVisor (basic cash)	5.37	5.53	5.30	6.82	6.30	6.56	6.14	5.99	5.86
AgriVisor (basic hedge)	5.30	5.53	5.30	6.82	6.30	6.56	6.14	5.99	5.85
Allendale (futures only)	5.73	5.75	5.05	5.45	5.58	5.52	5.36	5.46	5.51
Brock (cash-only)	5.32	5.63	5.30	5.98	6.15	6.06	5.81	5.76	5.68
Brock (hedge)	5.47	5.67	5.00	5.90	6.11	6.00	5.67	5.67	5.63
Cash Grain	5.47	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Co-Mark	5.57	5.64	5.35	6.89	N/A	N/A	N/A	5.96	N/A
Freese-Notis	5.60	5.53	5.28	5.71	5.88	5.79	5.62	5.60	5.60
Grain Field Marketing	N/A	5.39	5.79	6.78	5.65	6.21	6.07	5.90	N/A
Grain Field Report	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grain Marketing Plus	5.30	5.39	5.49	N/A	N/A	N/A	N/A	N/A	N/A
Harris Weather/Elliott Advisory	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
North American Ag	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Northstar Commodity	N/A	5.66	5.50	6.64	6.32	6.48	6.16	6.03	N/A
Pro Farmer (cash only)	5.34	5.59	5.40	6.66	5.85	6.25	5.97	5.87	5.77
Pro Farmer (hedge)	5.46	5.38	4.83	6.41	5.88	6.14	5.70	5.62	5.59
Progressive Ag	5.05	5.85	6.19	7.67	6.71	7.19	6.86	6.61	6.30
Prosperous Farmer	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Risk Management Group (cash only)	5.58	5.39	5.37	5.50	6.01	5.75	5.63	5.57	5.57
Risk Management Group (futures & options)	5.51	5.22	5.28	5.39	6.04	5.71	5.57	5.48	5.49
Risk Management Group (options only)	5.56	5.21	5.39	5.49	5.87	5.68	5.59	5.49	5.50
Stewart-Peterson Advisory Reports	5.49	5.82	4.88	5.89	6.15	6.02	5.64	5.69	5.65
Stewart-Peterson Strictly Cash	5.34	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Farmer Intelligence	5.81	5.28	5.03	6.07	5.93	6.00	5.68	5.58	5.62
Utterback Marketing Services	5.28	4.92	4.64	7.38	6.03	6.71	6.02	5.75	5.65
Zwicker Cycle Letter	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Descriptive Statistics:									
Average	5.50	5.50	5.28	6.25	6.13	6.17	5.87	5.79	5.72
Median	5.47	5.53	5.30	6.45	6.12	6.18	5.88	5.76	5.65
Minimum	5.05	4.92	4.64	3.70	5.58	4.96	5.09	5.17	5.21
Maximum	6.88	5.85	6.19	7.67	7.49	7.19	6.86	6.61	6.38
Range	1.83	0.93	1.55	3.98	1.91	2.23	1.77	1.44	1.17
Standard Deviation	0.32	0.21	0.32	0.81	0.37	0.49	0.37	0.30	0.26
Market Benchmarks									
24-month average	5.47	5.38	5.03	5.99	5.95	5.51	5.47	5.47	5.57
20-month average	5.40	5.27	5.16	6.40	6.02	5.78	5.61	5.56	5.65
Farmer Benchmarks									
USDA average price received	5.37	5.63	5.49	7.33	5.77	6.41	6.15	5.96	5.92
Market Prices	5.31	5.58	5.48	7.77	5.57	6.62	6.27	6.03	5.94

Notes: Net advisory prices and benchmark prices are stated on a harvest equivalent basis. A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest. N/A denotes "Not Applicable," since the indicated program did not exist or was not evaluated for the given crop year.

Table 17. Revenue Results for 40 Market Advisory Programs, 2000-2004 Crop Years, On-Farm Variable Storage Costs

Market Advisory Program	2000 50/50 Advisory Revenue	2001 50/50 Advisory Revenue	2002 50/50 Advisory Revenue	2003 50/50 Advisory Revenue	2004 50/50 Advisory Revenue	2002-03 Two-Year Average	2001-03 Three-Year Average	2000-03 Four-Year Average	2000-04 Five-Year Average
	---$ per acre (harvest equivalent)---								
Ag Alert for Ontario	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Financial Strategies	N/A	278	260	303	377	340	313	305	N/A
Ag Market Professional (cash only)	N/A	N/A	N/A	N/A	380	N/A	N/A	N/A	N/A
Ag Market Professional (hedge)	N/A	N/A	N/A	N/A	364	N/A	N/A	N/A	N/A
Ag Profit by Hjort	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Review	296	309	320	290	401	346	337	330	323
AgLine by Doane (cash only)	307	291	295	351	381	366	342	329	325
AgLine by Doane (hedge)	310	291	298	347	382	365	342	329	326
AgResource	393	278	307	370	457	414	378	353	361
Agri-Edge (cash only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Edge (hedge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Mark	307	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AgriVisor (aggressive cash)	308	296	312	337	400	369	350	336	331
AgriVisor (aggressive hedge)	307	296	312	337	409	373	353	339	332
AgriVisor (basic cash)	306	294	312	337	400	369	350	336	330
AgriVisor (basic hedge)	304	292	312	337	400	369	350	335	329
Allendale (futures only)	317	302	287	312	385	348	328	322	321
Brock (cash-only)	292	294	318	329	383	356	343	331	323
Brock (hedge)	318	294	310	323	376	350	337	326	324
Cash Grain	299	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Co-Mark	298	302	294	341	N/A	341	317	312	309
Freese-Notis	307	288	300	324	378	351	334	322	319
Grain Field Marketing	N/A	301	306	337	370	354	338	328	N/A
Grain Field Report	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grain Marketing Plus	276	296	293	N/A	N/A	N/A	N/A	N/A	N/A
Harris Weather/Elliott Advisory	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
North American Ag	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Northstar Commodity	N/A	297	299	347	389	368	345	333	N/A
Pro Farmer (cash only)	289	297	297	329	357	343	328	320	314
Pro Farmer (hedge)	282	285	268	317	366	341	317	309	304
Progressive Ag	294	351	328	380	448	414	385	377	360
Prosperous Farmer	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Risk Management Group (cash only)	312	298	301	309	366	337	325	319	317
Risk Management Group (futures & options)	308	290	311	312	362	337	328	319	317
Risk Management Group (options only)	308	290	302	312	369	341	328	318	316
Stewart-Peterson Advisory Reports	281	305	285	317	405	361	336	328	319
Stewart-Peterson Strictly Cash	289	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Farmer Intelligence	331	305	283	316	377	346	325	320	322
Utterback Marketing Services	314	284	281	330	419	374	343	328	326
Zwicker Cycle Letter	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Descriptive Statistics:									
Average	306	296	299	330	389	359	339	328	325
Median	307	295	300	329	381	354	337	328	323
Minimum	276	278	260	290	357	337	313	305	304
Maximum	393	351	328	380	457	414	385	377	361
Range	116	73	68	90	100	77	72	72	57
Standard Deviation	22	13	16	20	25	21	17	14	13
Market Benchmarks									
24-month average	300	291	289	324	371	307	302	301	319
20-month average	293	285	292	333	370	312	303	301	320
Farmer Benchmarks									
USDA average price received	290	297	305	351	369	328	318	311	331
Market Prices	287	293	303	363	342	333	320	311	325

Notes: Net advisory prices and benchmark prices are stated on a harvest equivalent basis. A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest. N/A denotes "Not Applicable," since the indicated program did not exist or was not evaluated for the given crop year.

Table 18. Pricing Results for 41 Market Advisory Programs, Corn, 1995-2004 Crop Years, Commercial Storage Costs

Market Advisory Program	1995 Net Advisory Price	1996 Net Advisory Price	1997 Net Advisory Price	1998 Net Advisory Price	1999 Net Advisory Price	2000 Net Advisory Price	2001 Net Advisory Price	2002 Net Advisory Price	2003 Net Advisory Price	2004 Net Advisory Price
	---$ per bushel (harvest equivalent)---									
Ag Alert for Ontario	N/A	2.46	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Financial Strategies	N/A	N/A	N/A	N/A	N/A	N/A	1.80	1.80	1.95	2.22
Ag Market Professional (cash only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.18
Ag Market Professional (hedge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.96
Ag Profit by Hjort	3.08	2.49	2.00	2.05	1.89	N/A	N/A	N/A	N/A	N/A
Ag Review	2.59	2.76	2.57	2.25	2.12	2.03	2.17	2.37	2.38	2.46
AgLine by Doane (cash only)	3.15	2.65	2.33	2.22	2.08	2.18	1.96	2.03	2.41	2.29
AgLine by Doane (hedge)	N/A	2.61	2.29	2.32	2.13	2.26	1.98	2.05	2.38	2.25
AgResource	3.90	3.12	2.07	2.21	2.49	2.78	1.61	2.27	2.67	2.65
Agri-Edge (cash only)	3.07	2.62	2.15	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Edge (hedge)	3.15	3.10	2.35	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Mark	3.62	2.73	2.13	1.97	2.03	2.06	N/A	N/A	N/A	N/A
AgriVisor (aggressive cash)	3.30	2.83	2.43	2.25	2.12	2.23	1.98	2.30	2.24	2.39
AgriVisor (aggressive hedge)	3.10	2.58	2.41	2.05	1.99	2.23	1.98	2.30	2.25	2.48
AgriVisor (basic cash)	2.72	2.65	2.34	2.16	2.10	2.21	1.96	2.30	2.24	2.39
AgriVisor (basic hedge)	2.90	2.63	2.33	2.03	2.07	2.21	1.92	2.30	2.25	2.39
Allendale (futures & options)	N/A	2.75	2.38	2.09	2.10	1.91	1.99	1.94	2.21	2.37
Allendale (futures only)	2.46	2.08	2.55	2.36	2.20	2.17	2.01	2.01	2.19	2.29
Brock (cash only)	2.74	2.70	2.33	2.10	2.09	1.98	1.88	2.42	2.28	2.24
Brock (hedge)	2.29	2.39	2.64	2.40	2.03	2.29	1.87	2.43	2.24	2.19
Cash Grain	N/A	N/A	N/A	N/A	2.06	2.06	N/A	N/A	N/A	N/A
Co-Mark	N/A	N/A	N/A	N/A	N/A	2.03	2.05	2.11	2.21	N/A
Freese-Notis	2.95	2.87	2.22	2.23	1.78	2.07	1.81	2.11	2.30	2.29
Grain Field Marketing	N/A	N/A	N/A	N/A	N/A	N/A	2.00	2.12	2.20	2.25
Grain Field Report	3.19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grain Marketing Plus	N/A	N/A	N/A	N/A	N/A	1.79	2.03	2.01	N/A	N/A
Harris Weather/Elliott Advisory	3.16	2.28	N/A	N/A	N/A	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	N/A	N/A	N/A
Northstar Commodity	N/A	N/A	N/A	N/A	N/A	N/A	1.93	2.05	2.29	2.23
Pro Farmer (cash only)	3.16	2.64	2.19	2.09	1.66	1.91	1.94	2.00	2.15	2.03
Pro Farmer (hedge)	3.05	2.67	2.28	2.19	1.69	1.83	1.91	1.91	2.09	2.12
Progressive Ag	N/A	2.53	2.26	1.93	1.93	2.12	2.48	2.19	2.44	2.70
Prosperous Farmer	2.91	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Risk Management Group (cash only)	N/A	N/A	N/A	N/A	2.10	2.20	2.03	2.18	2.14	2.09
Risk Management Group (futures & options)	N/A	N/A	N/A	N/A	1.97	2.19	1.99	2.35	2.21	2.03
Risk Management Group (options only)	N/A	N/A	N/A	N/A	1.98	2.16	2.00	2.19	2.20	2.15
Stewart-Peterson Advisory Reports	2.90	2.46	2.09	2.02	1.90	1.81	2.04	2.10	2.19	2.46
Stewart-Peterson Strictly Cash	2.92	2.68	2.32	2.28	1.95	1.94	N/A	N/A	N/A	N/A
Top Farmer Intelligence	3.17	2.44	2.15	2.12	2.10	2.38	2.20	2.02	2.14	2.27
Utterback Marketing Services	N/A	N/A	2.74	2.51	2.08	2.39	2.11	2.09	2.07	2.64
Zwicker Cycle Letter	3.15	2.56	2.40	2.03	N/A	N/A	N/A	N/A	N/A	N/A
Descriptive Statistics:										
Average	3.03	2.63	2.32	2.17	2.02	2.13	1.99	2.15	2.24	2.30
Median	3.08	2.64	2.33	2.16	2.07	2.16	1.98	2.11	2.23	2.27
Minimum	2.29	2.08	2.00	1.93	1.66	1.79	1.61	1.80	1.95	1.96
Maximum	3.90	3.12	2.74	2.51	2.49	2.78	2.48	2.43	2.67	2.70
Range	1.61	1.04	0.74	0.58	0.83	0.99	0.87	0.63	0.72	0.74
Standard Deviation	0.33	0.22	0.18	0.15	0.16	0.21	0.15	0.16	0.14	0.19
Market Benchmarks										
24-month average	2.90	2.65	2.33	2.24	2.05	2.09	2.00	2.10	2.23	2.19
20-month average	3.07	2.66	2.27	2.12	1.97	2.01	1.94	2.09	2.22	2.15
Farmer Benchmarks										
USDA prices	3.06	2.50	2.23	1.97	1.93	1.95	1.95	2.11	2.22	2.17
Market Prices	3.32	2.42	2.17	1.92	1.89	1.93	1.91	2.08	2.25	1.95

Notes: Net advisory prices and benchmark prices are stated on a harvest equivalent basis. A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest. N/A denotes "Not Applicable," since the indicated program did not exist or was not evaluated for the given crop year.

Table 19. Pricing Results for 40 Market Advisory Programs, Soybeans, 1995-2004 Crop Years, Commercial Storage Costs

Market Advisory Program	1995 Net Advisory Price	1996 Net Advisory Price	1997 Net Advisory Price	1998 Net Advisory Price	1999 Net Advisory Price	2000 Net Advisory Price	2001 Net Advisory Price	2002 Net Advisory Price	2003 Net Advisory Price	2004 Net Advisory Price
				---$ per bushel (harvest equivalent)---						
Ag Alert for Ontario	N/A	7.37	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Financial Strategies	N/A	N/A	N/A	N/A	N/A	N/A	5.33	4.77	5.95	5.77
Ag Market Professional (cash only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.11
Ag Market Professional (hedge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.14
Ag Profit by Hjort	6.77	7.13	6.16	5.26	5.34	N/A	N/A	N/A	N/A	N/A
Ag Review	6.59	7.37	6.19	5.11	4.68	5.23	5.34	5.27	3.69	6.18
AgLine by Doane (cash only)	6.59	7.39	6.32	5.65	5.45	5.46	5.42	5.36	6.48	5.87
AgLine by Doane (hedge)	N/A	N/A	N/A	5.60	5.45	5.32	5.35	5.48	6.43	6.08
AgResource	6.92	7.29	6.47	6.17	7.10	6.83	5.74	5.19	6.44	7.45
Agri-Edge (cash only)	6.70	7.28	6.06	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Edge (hedge)	6.62	7.18	6.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Mark	7.94	7.18	6.68	5.71	5.60	5.60	N/A	N/A	N/A	N/A
AgriVisor (aggressive cash)	6.38	7.28	6.33	5.55	5.48	5.35	5.48	5.26	6.79	6.24
AgriVisor (aggressive hedge)	6.97	7.40	6.14	5.77	5.40	5.29	5.48	5.26	6.79	6.24
AgriVisor (basic cash)	6.42	7.06	6.35	5.55	5.48	5.31	5.46	5.26	6.79	6.24
AgriVisor (basic hedge)	6.78	7.46	6.14	5.79	5.40	5.25	5.46	5.26	6.79	6.24
Allendale (futures only)	6.21	7.30	6.67	5.90	5.64	5.68	5.70	5.00	5.42	5.53
Brock (cash-only)	6.27	7.20	6.31	5.65	5.68	5.23	5.54	5.28	5.97	6.12
Brock (hedge)	5.66	6.99	6.93	6.58	6.33	5.41	5.62	5.00	5.89	6.08
Cash Grain	N/A	N/A	N/A	N/A	5.99	5.40	N/A	N/A	N/A	N/A
Co-Mark	N/A	N/A	N/A	N/A	N/A	5.53	5.59	5.30	6.83	N/A
Freese-Notis	6.40	7.13	6.15	5.81	5.32	5.46	5.47	5.24	5.71	5.85
Grain Field Marketing	N/A	N/A	N/A	N/A	N/A	N/A	5.35	5.79	6.74	5.62
Grain Field Report	6.84	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grain Marketing Plus	N/A	N/A	N/A	N/A	N/A	5.23	5.34	5.41	N/A	N/A
Harris Weather/Elliott Advisory	6.85	6.80	N/A	N/A	N/A	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	N/A	N/A	N/A
Northstar Commodity	N/A	N/A	N/A	N/A	N/A	N/A	5.57	5.44	6.61	6.26
Pro Farmer (cash only)	6.69	7.31	6.29	5.74	5.51	5.28	5.48	5.30	6.60	5.78
Pro Farmer (hedge)	6.78	7.49	6.47	5.85	5.81	5.41	5.32	4.80	6.39	5.81
Progressive Ag	N/A	7.80	6.65	5.71	5.68	5.00	5.82	6.15	7.67	6.66
Prosperous Farmer	6.51	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Risk Management Group (cash only)	N/A	N/A	N/A	N/A	5.51	5.53	5.39	5.37	5.50	5.97
Risk Management Group (futures & options)	N/A	N/A	N/A	N/A	5.70	5.46	5.22	5.28	5.39	6.00
Risk Management Group (options only)	N/A	N/A	N/A	N/A	5.51	5.51	5.21	5.39	5.49	5.82
Stewart-Peterson Advisory Reports	6.09	7.37	6.22	6.36	6.00	5.45	5.77	4.86	5.86	6.12
Stewart-Peterson Strictly Cash	6.28	7.13	6.33	5.96	5.42	5.24	N/A	N/A	N/A	N/A
Top Farmer Intelligence	6.20	6.84	6.08	6.32	6.23	5.76	5.23	5.01	6.06	5.91
Utterback Marketing Services	N/A	N/A	6.99	6.13	6.14	5.27	4.89	4.59	7.34	5.82
Zwicker Cycle Letter	6.89	7.67	6.59	5.76	N/A	N/A	N/A	N/A	N/A	N/A
Descriptive Statistics:										
Average	6.59	7.27	6.38	5.82	5.67	5.44	5.45	5.24	6.22	6.07
Median	6.59	7.28	6.32	5.77	5.51	5.40	5.46	5.26	6.43	6.08
Minimum	5.66	6.80	6.06	5.11	4.68	5.00	4.89	4.59	3.69	5.53
Maximum	7.94	7.80	6.99	6.58	7.10	6.83	5.82	6.15	7.67	7.45
Range	2.28	1.00	0.93	1.47	2.42	1.83	0.93	1.55	3.99	1.92
Standard Deviation	0.42	0.23	0.26	0.34	0.45	0.33	0.20	0.31	0.80	0.37
Market Benchmarks										
24-month average	6.26	7.08	6.30	5.86	5.50	5.42	5.34	4.98	5.95	5.90
20-month average	6.39	7.21	6.22	5.64	5.30	5.38	5.21	5.10	6.35	5.95
Farmer Benchmarks										
USDA prices	6.59	7.17	6.17	5.18	5.39	5.29	5.55	5.41	7.27	5.69
Market Prices	6.77	7.12	6.08	5.05	5.37	5.23	5.49	5.40	7.70	5.49

Notes: Net advisory prices and benchmark prices are stated on a harvest equivalent basis. A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest. N/A denotes "Not Applicable," since the indicated program did not exist or was not evaluated for the given crop year.

Table 20. Revenue Results for 40 Market Advisory Programs, 1995-2004 Crop Years, Commercial Storage Costs

Market Advisory Program	1995 50/50 Advisory Revenue	1996 50/50 Advisory Revenue	1997 50/50 Advisory Revenue	1998 50/50 Advisory Revenue	1999 50/50 Advisory Revenue	2000 50/50 Advisory Revenue	2001 50/50 Advisory Revenue	2002 50/50 Advisory Revenue	2003 50/50 Advisory Revenue	2004 50/50 Advisory Revenue
					---$ per acre (harvest equivalent)---					
Ag Alert for Ontario	N/A	359	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Financial Strategies	N/A	N/A	N/A	N/A	N/A	N/A	270	256	292	363
Ag Market Professional (cash only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	368
Ag Market Professional (hedge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	348
Ag Profit by Hjort	326	355	283	282	280	N/A	N/A	N/A	N/A	N/A
Ag Review	292	382	324	293	282	285	298	311	288	395
AgLine by Doane (cash only)	326	373	310	304	298	301	284	288	343	372
AgLine by Doane (hedge)	N/A	N/A	N/A	310	302	305	284	293	340	373
AgResource	377	407	295	316	371	381	264	301	367	448
Agri-Edge (cash only)	323	369	291	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Edge (hedge)	327	403	310	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Mark	382	375	304	287	297	295	N/A	N/A	N/A	N/A
AgriVisor (aggressive cash)	330	385	317	303	302	303	287	305	334	390
AgriVisor (aggressive hedge)	331	369	311	294	289	301	287	305	334	400
AgriVisor (basic cash)	297	366	311	297	300	300	285	305	334	390
AgriVisor (basic hedge)	315	374	306	293	296	299	282	305	334	390
Allendale (futures only)	277	327	334	321	312	306	294	277	304	362
Brock (cash-only)	295	373	310	295	304	281	280	315	322	374
Brock (hedge)	255	344	346	340	315	309	281	308	317	368
Cash Grain	N/A	N/A	N/A	N/A	310	290	N/A	N/A	N/A	N/A
Co-Mark	N/A	N/A	N/A	N/A	N/A	291	295	292	332	N/A
Freese-Notis	310	385	298	308	271	293	274	291	319	371
Grain Field Marketing	N/A	N/A	N/A	N/A	N/A	N/A	286	306	330	361
Grain Field Report	333	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grain Marketing Plus	N/A	N/A	N/A	N/A	N/A	265	287	287	N/A	N/A
Harris Weather/Elliott Advisory	332	331	N/A	N/A	N/A	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	N/A	N/A	N/A
Northstar Commodity	N/A	N/A	N/A	N/A	N/A	N/A	286	291	335	377
Pro Farmer (cash only)	329	371	299	296	266	276	284	285	322	345
Pro Farmer (hedge)	324	377	310	307	276	273	278	264	313	354
Progressive Ag	N/A	374	313	284	292	286	334	320	369	431
Prosperous Farmer	310	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Risk Management Group (cash only)	N/A	N/A	N/A	N/A	301	305	289	299	301	356
Risk Management Group (futures & options)	N/A	N/A	N/A	N/A	295	302	282	310	305	351
Risk Management Group (options only)	N/A	N/A	N/A	N/A	291	301	282	301	305	358
Stewart-Peterson Advisory Reports	300	358	291	306	297	272	299	281	312	395
Stewart-Peterson Strictly Cash	306	370	309	316	287	277	N/A	N/A	N/A	N/A
Top Farmer Intelligence	319	345	292	313	318	325	298	278	311	371
Utterback Marketing Services	N/A	N/A	354	337	315	314	283	273	329	403
Zwicker Cycle Letter	332	373	322	292	N/A	N/A	N/A	N/A	N/A	N/A
Descriptive Statistics:										
Average	319	369	311	304	299	298	287	294	324	377
Median	324	372	310	304	297	299	284	296	322	371
Minimum	255	327	283	282	266	265	264	256	288	345
Maximum	382	407	354	340	371	381	334	320	369	448
Range	128	80	71	58	105	116	70	64	81	102
Standard Deviation	27	19	17	15	20	22	13	16	20	25
Market Benchmarks										
24-month average	304	366	310	311	297	294	285	284	317	363
20-month average	317	371	304	296	286	286	277	285	324	361
Farmer Benchmarks										
USDA prices	320	357	300	274	285	279	286	295	341	356
Market Prices	340	349	293	267	281	277	281	293	352	329

Notes: Net advisory prices and benchmark prices are stated on a harvest equivalent basis. A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest. N/A denotes "Not Applicable," since the indicated program did not exist or was not evaluated for the given crop year.

Table 21. Pricing Results for 41 Market Advisory Programs, Corn, Two-Year through Ten-Year Averages, 1995-2004 Crop Years, Commercial Storage Costs

Market Advisory Program	2003-04 Two-Year Average	2002-04 Three-Year Average	2001-04 Four-Year Average	2000-04 Five-Year Average	1999-04 Six-Year Average	1998-04 Seven-Year Average	1997-04 Eight-Year Average	1996-04 Nine-Year Average	1995-04 Ten-Year Average
					---$ per bushel (harvest equivalent)---				
Ag Alert for Ontario	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Financial Strategies	2.09	1.99	1.95	N/A	N/A	N/A	N/A	N/A	N/A
Ag Market Pro (cash)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Market Pro (hedge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Profit by Hjort	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Review	2.42	2.40	2.34	2.28	2.25	2.25	2.29	2.35	2.37
AgLine by Doane (cash only)	2.35	2.24	2.17	2.17	2.16	2.17	2.19	2.24	2.33
AgLine by Doane (hedge)	2.31	2.23	2.17	2.18	2.18	2.20	2.21	2.25	N/A
AgResource	2.66	2.53	2.30	2.40	2.41	2.38	2.34	2.43	2.58
Agri-Edge (cash only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Edge (hedge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Mark	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AgriVisor (aggressive cash)	2.31	2.31	2.23	2.23	2.21	2.21	2.24	2.31	2.41
AgriVisor (aggressive hedge)	2.37	2.34	2.25	2.25	2.20	2.18	2.21	2.25	2.34
AgriVisor (basic cash)	2.31	2.31	2.22	2.22	2.20	2.19	2.21	2.26	2.31
AgriVisor (basic hedge)	2.32	2.31	2.21	2.21	2.19	2.17	2.19	2.24	2.30
Allendale (futures & options)	2.29	2.17	2.13	2.08	2.09	2.09	2.12	2.19	N/A
Allendale (futures only)	2.24	2.16	2.13	2.13	2.15	2.18	2.22	2.21	2.23
Brock (cash only)	2.26	2.31	2.21	2.16	2.15	2.14	2.17	2.23	2.28
Brock (hedge)	2.22	2.29	2.18	2.20	2.17	2.21	2.26	2.27	2.28
Cash Grain	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Co-Mark	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Freese-Notis	2.29	2.23	2.13	2.12	2.06	2.08	2.10	2.19	2.26
Grain Field Marketing	2.23	2.19	2.14	N/A	N/A	N/A	N/A	N/A	N/A
Grain Field Report	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grain Marketing Plus	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Harris Weather/Elliott Advisory	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
North American Ag	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Northstar Commodity	2.26	2.19	2.13	N/A	N/A	N/A	N/A	N/A	N/A
Pro Farmer (cash only)	2.09	2.06	2.03	2.01	1.95	1.97	2.00	2.07	2.18
Pro Farmer (hedge)	2.11	2.04	2.01	1.97	1.92	1.96	2.00	2.08	2.17
Progressive Ag	2.57	2.44	2.45	2.39	2.31	2.26	2.26	2.29	N/A
Prosperous Farmer	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Risk Management Group (cash only)	2.12	2.14	2.11	2.13	2.12	N/A	N/A	N/A	N/A
Risk Management Group (futures & options)	2.12	2.20	2.15	2.15	2.12	N/A	N/A	N/A	N/A
Risk Management Group (options only)	2.18	2.18	2.14	2.14	2.11	N/A	N/A	N/A	N/A
Stewart-Peterson Advisory Reports	2.33	2.25	2.20	2.12	2.08	2.07	2.08	2.12	2.20
Stewart-Peterson Strictly Cash	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Farmer Intelligence	2.21	2.15	2.16	2.20	2.19	2.18	2.17	2.20	2.30
Utterback Marketing Services	2.36	2.27	2.23	2.26	2.23	2.27	2.33	N/A	N/A
Zwicker Cycle Letter	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Average	2.28	2.24	2.17	2.18	2.16	2.17	2.19	2.23	2.30
Minimum	2.09	1.99	1.95	1.97	1.92	1.96	2.00	2.07	2.17
Maximum	2.66	2.53	2.45	2.40	2.41	2.38	2.34	2.43	2.58
Range	0.57	0.54	0.51	0.42	0.49	0.42	0.35	0.36	0.40
Market Benchmarks									
24-Month Average	2.21	2.17	2.13	2.12	2.11	2.13	2.16	2.21	2.28
20-Month Average	2.19	2.15	2.10	2.08	2.06	2.07	2.10	2.16	2.25
Farmer Benchmarks									
USDA prices	2.09	2.17	2.11	2.08	2.05	2.04	2.07	2.12	2.21
Market prices	2.08	2.09	2.05	2.02	2.00	1.99	2.01	2.06	2.18

Notes: Net advisory prices and benchmark prices are stated on a harvest equivalent basis. A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest. N/A denotes "Not Applicable," since the indicated program did not exist or was not evaluated for the given crop year. The average, minimum, maximum and range are computed across the advisory program averages in the indicated column. As a result, the statistics reflect performance only for those advisory programs active during each of the indicated crop years.

Table 22. Pricing Results for 40 Market Advisory Programs, Soybeans, Two-Year through Ten-Year Averages, 1995-2004 Crop Years, Commercial Storage Costs

Market Advisory Program	2003-04 Two-Year Average	2002-04 Three-Year Average	2001-04 Four-Year Average	2000-04 Five-Year Average	1999-04 Six-Year Average	1998-04 Seven-Year Average	1997-04 Eight-Year Average	1996-04 Nine-Year Average	1995-04 Ten-Year Average
	---$ per bushel (harvest equivalent)---								
Ag Alert for Ontario	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Financial Strategies	5.86	5.50	5.46	N/A	N/A	N/A	N/A	N/A	N/A
Ag Market Pro (cash)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Market Pro (hedge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Profit by Hjort	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Review	4.93	5.04	5.12	5.14	5.06	5.07	5.21	5.45	5.56
AgLine by Doane (cash only)	6.17	5.90	5.78	5.72	5.67	5.67	5.75	5.93	6.00
AgLine by Doane (hedge)	6.26	6.00	5.84	5.74	5.69	5.68	N/A	N/A	N/A
AgResource	6.95	6.36	6.21	6.33	6.46	6.42	6.42	6.52	6.56
Agri-Edge (cash only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Edge (hedge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Mark	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AgriVisor (aggressive cash)	6.52	6.10	5.94	5.83	5.77	5.74	5.81	5.97	6.02
AgriVisor (aggressive hedge)	6.52	6.10	5.94	5.81	5.74	5.75	5.80	5.98	6.07
AgriVisor (basic cash)	6.52	6.10	5.94	5.81	5.76	5.73	5.81	5.95	5.99
AgriVisor (basic hedge)	6.52	6.10	5.94	5.80	5.73	5.74	5.79	5.98	6.06
Allendale (futures only)	5.48	5.32	5.41	5.47	5.49	5.55	5.69	5.87	5.90
Brock (cash-only)	6.04	5.79	5.73	5.63	5.64	5.64	5.72	5.89	5.93
Brock (hedge)	5.98	5.66	5.65	5.60	5.72	5.84	5.98	6.09	6.05
Cash Grain	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Co-Mark	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Freese-Notis	5.78	5.60	5.57	5.54	5.51	5.55	5.62	5.79	5.85
Grain Field Marketing	6.18	6.05	5.88	N/A	N/A	N/A	N/A	N/A	N/A
Grain Field Report	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grain Marketing Plus	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Harris Weather/Elliott Advisory	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
North American Ag	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Northstar Commodity	6.44	6.10	5.97	N/A	N/A	N/A	N/A	N/A	N/A
Pro Farmer (cash only)	6.19	5.90	5.79	5.69	5.66	5.67	5.75	5.92	6.00
Pro Farmer (hedge)	6.10	5.67	5.58	5.55	5.59	5.63	5.73	5.93	6.01
Progressive Ag	7.17	6.83	6.57	6.26	6.16	6.10	6.17	6.35	N/A
Prosperous Farmer	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Risk Management Group (cash only)	5.73	5.61	5.56	5.55	5.54	N/A	N/A	N/A	N/A
Risk Management Group (futures & options)	5.69	5.56	5.47	5.47	5.51	N/A	N/A	N/A	N/A
Risk Management Group (options only)	5.66	5.57	5.48	5.48	5.49	N/A	N/A	N/A	N/A
Stewart-Peterson Advisory Reports	5.99	5.61	5.65	5.61	5.68	5.77	5.83	6.00	6.01
Stewart-Peterson Strictly Cash	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Farmer Intelligence	5.98	5.66	5.55	5.59	5.70	5.79	5.83	5.94	5.96
Utterback Marketing Services	6.58	5.92	5.66	5.58	5.67	5.74	5.90	N/A	N/A
Zwicker Cycle Letter	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Average	6.13	5.83	5.74	5.68	5.68	5.73	5.81	5.97	6.00
Minimum	4.93	5.04	5.12	5.14	5.06	5.07	5.21	5.45	5.56
Maximum	7.17	6.83	6.57	6.33	6.46	6.42	6.42	6.52	6.56
Range	2.23	1.78	1.45	1.19	1.39	1.35	1.21	1.07	1.00
Market Benchmarks									
24-Month Average	5.93	5.61	5.54	5.52	5.52	5.56	5.66	5.81	5.86
20-Month Average	6.15	5.80	5.66	5.60	5.55	5.56	5.65	5.82	5.88
Farmer Benchmarks									
USDA prices	6.48	6.13	5.98	5.84	5.77	5.68	5.75	5.90	5.97
Market prices	6.60	6.20	6.02	5.86	5.78	5.68	5.73	5.88	5.97

Notes: Net advisory prices and benchmark prices are stated on a harvest equivalent basis. A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest. N/A denotes "Not Applicable," since the indicated program did not exist or was not evaluated for the given crop year. The average, minimum, maximum and range are computed across the advisory program averages in the indicated column. As a result, the statistics reflect performance only for those advisory programs active during each of the indicated crop years.

Table 23. Revenue Results for 40 Market Advisory Programs, Two-Year through Ten-Year Averages, 1995-2004 Crop Years, Commercial Storage Costs

Market Advisory Program	2003-04 Two-Year Average	2002-04 Three-Year Average	2001-04 Four-Year Average	2000-04 Five-Year Average	1999-04 Six-Year Average	1998-04 Seven-Year Average	1997-04 Eight-Year Average	1996-04 Nine-Year Average	1995-04 Ten-Year Average
					---$ per acre (harvest equivalent)---				
Ag Alert for Ontario	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Financial Strategies	327	303	295	N/A	N/A	N/A	N/A	N/A	N/A
Ag Market Pro (cash)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Market Pro (hedge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Profit by Hjort	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag Review	341	331	323	315	310	307	310	318	315
AgLine by Doane (cash only)	357	334	322	318	314	313	312	319	320
AgLine by Doane (hedge)	357	335	323	319	316	315	N/A	N/A	N/A
AgResource	407	372	345	352	355	350	343	350	353
Agri-Edge (cash only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Edge (hedge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agri-Mark	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AgriVisor (aggressive cash)	362	343	329	324	320	318	318	325	326
AgriVisor (aggressive hedge)	367	346	332	326	319	316	315	321	322
AgriVisor (basic cash)	362	343	329	323	319	316	315	321	319
AgriVisor (basic hedge)	362	343	328	322	318	314	313	320	319
Allendale (futures only)	333	314	309	309	309	311	314	315	311
Brock (cash-only)	348	337	323	314	313	310	310	317	315
Brock (hedge)	342	331	319	317	316	320	323	325	318
Cash Grain	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Co-Mark	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Freese-Notis	345	327	313	309	303	304	303	312	312
Grain Field Marketing	345	332	320	N/A	N/A	N/A	N/A	N/A	N/A
Grain Field Report	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grain Marketing Plus	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Harris Weather/Elliott Advisory	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
North American Ag	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Northstar Commodity	356	335	322	N/A	N/A	N/A	N/A	N/A	N/A
Pro Farmer (cash only)	334	317	309	302	296	296	297	305	307
Pro Farmer (hedge)	333	310	302	296	293	295	297	306	308
Progressive Ag	400	373	363	348	339	331	329	334	N/A
Prosperous Farmer	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Risk Management Group (cash only)	328	319	311	310	308	N/A	N/A	N/A	N/A
Risk Management Group (futures & options)	328	322	312	310	307	N/A	N/A	N/A	N/A
Risk Management Group (options only)	331	321	312	309	306	N/A	N/A	N/A	N/A
Stewart-Peterson Advisory Reports	353	329	321	311	309	309	306	312	311
Stewart-Peterson Strictly Cash	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Farmer Intelligence	341	320	315	317	317	316	313	317	317
Utterback Marketing Services	366	335	322	320	319	322	326	N/A	N/A
Zwicker Cycle Letter	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Average	351	332	321	318	315	315	314	320	318
Minimum	327	303	295	296	293	295	297	305	307
Maximum	407	373	363	352	355	350	343	350	353
Range	80	70	69	56	62	55	46	45	46
Market Benchmarks									
24-Month Average	340	321	312	309	307	307	307	314	313
20-Month Average	342	323	312	307	303	302	303	310	311
Farmer Benchmarks									
USDA prices	348	331	319	311	307	302	302	308	309
Market prices	341	325	314	306	302	297	297	303	306

Notes: Net advisory prices and benchmark prices are stated on a harvest equivalent basis. A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest. N/A denotes "Not Applicable," since the indicated program did not exist or was not evaluated for the given crop year. The average, minimum, maximum and range are computed across the advisory program averages in the indicated column. As a result, the statistics reflect performance only for those advisory programs active during each of the indicated crop years.

Table 24. Average Pricing Performance Results for Market Advisory Programs by Underlying Components, Corn and Soybeans, 1995 - 2004 Crop Years, Commercial Storage Costs

Commodity/Advisory Program and Benchmark	1995 - 2004 Average								
	Unadjusted Cash Sales Price	Commercial Storage Costs			Net Cash Sales Price	Futures & Options Gain	Brokerage Costs	LDP / MLG	Net Advisory Price
		Physical Storage	Shrinkage	Interest					
	---$ per bushel---								
Panel A: Average Price Components									
Corn									
Advisory Programs	2.36	0.11	0.03	0.04	2.18	0.02	0.02	0.12	2.29
24-Month Market Benchmark	2.33	0.09	0.02	0.03	2.19	0.00	0.00	0.09	2.28
20-Month Market Benchmark	2.34	0.10	0.03	0.04	2.17	0.00	0.00	0.08	2.25
Farmer: USDA Prices	2.34	0.15	0.04	0.06	2.09	0.00	0.00	0.12	2.21
Farmer: Market Prices	2.32	0.15	0.04	0.06	2.07	0.00	0.00	0.12	2.18
Soybeans									
Advisory Programs	5.79	0.10	N/A	0.09	5.61	0.04	0.02	0.38	6.00
24-Month Market Benchmark	5.71	0.08	N/A	0.08	5.55	0.00	0.00	0.31	5.86
20-Month Market Benchmark	5.77	0.10	N/A	0.10	5.57	0.00	0.00	0.31	5.88
Farmer: USDA Prices	5.89	0.14	N/A	0.14	5.61	0.00	0.00	0.36	5.97
Farmer: Market Prices	5.90	0.15	N/A	0.14	5.61	0.00	0.00	0.36	5.97
Panel B: Average Difference in Price Components									
Corn									
Advisory Programs - 24-Month Benchmark	0.04	0.03	0.01	0.01	0.00	0.02	0.02	0.03	0.02
Advisory Programs - 20-Month Benchmark	0.03	0.01	0.00	0.00	0.02	0.02	0.02	0.03	0.05
Advisory Programs - Farmer: USDA Prices	0.02	-0.04	-0.01	-0.02	0.09	0.02	0.02	0.00	0.09
Advisory Programs - Farmer: Market Prices	0.05	-0.04	-0.01	-0.01	0.11	0.02	0.02	0.00	0.11
Soybeans									
Advisory Programs - 24-Month Benchmark	0.10	0.02	N/A	0.01	0.08	0.04	0.02	0.06	0.16
Advisory Programs - 20-Month Benchmark	0.04	0.00	N/A	-0.01	0.05	0.04	0.02	0.07	0.14
Advisory Programs - Farmer: USDA Prices	-0.09	-0.04	N/A	-0.05	0.01	0.04	0.02	0.01	0.04
Advisory Programs - Farmer: Market Prices	-0.09	-0.05	N/A	-0.06	0.01	0.04	0.02	0.01	0.04

Notes: Net cash sales price is calculated as unadjusted cash sales price minus commercial storage costs. Net advisory price is calculated as net cash sales price plus futures and options gains minus brokerage costs plus LDP/MLG, and therefore, is stated on a harvest equivalent basis. Market and farmer benchmark prices also are stated on a harvest equivalent basis. LDP stands for loan deficiency payment and MLG stands for marketing loan gain. LDP/MLGs were not paid for the 1995 - 1997 and 2002 crop years for corn and the 1995-1997 and 2003 crop years for soybeans. Average differences for 1995-2004 are computed over the full set of advisory programs. As a result, differences in the averages reported in Panel A may not equal the average differences reported in Panel B. N/A denotes "Not Applicable."

Table 25. Comparison of Survivor and Grand Averages, Corn, Soybeans and 50/50 Revenue, 1995-2004 Crop Years, Commercial Storage Costs

Commodity/Average	2003-04 Two-Year Average	2002-04 Three-Year Average	2001-04 Four-Year Average	2000-04 Five-Year Average	1999-04 Six-Year Average	1998-04 Seven-Year Average	1997-04 Eight-Year Average	1996-04 Nine-Year Average	1995-04 Ten-Year Average
				---$ per bushel (harvest equivalent)---					
Corn									
Survivor Average	2.28	2.24	2.17	2.18	2.16	2.17	2.19	2.23	2.30
Grand Average	2.27	2.23	2.17	2.16	2.14	2.14	2.16	2.21	2.29
Difference	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.02	0.01
				---$ per bushel (harvest equivalent)---					
Soybeans									
Survivor Average	6.13	5.83	5.74	5.68	5.68	5.73	5.81	5.97	6.00
Grand Average	6.15	5.84	5.74	5.68	5.68	5.70	5.78	5.94	6.00
Difference	-0.01	-0.01	-0.01	-0.01	0.00	0.03	0.04	0.04	0.00
				---$ per acre (harvest equivalent)---					
50/50 Advisory Revenue									
Survivor Average	351	332	321	318	315	315	314	320	318
Grand Average	351	332	320	316	313	312	312	318	318
Difference	0	0	0	2	2	3	3	2	0

Notes: Net advisory revenues and benchmark revenues are stated on a harvest equivalent basis. A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest. “Survivor averages” are based on advisory programs active in all crop years of a given averaging period. “Grand averages” are based on all advisory programs active in a given averaging period , whether they “survived” the entire period or not. The measure of survivorship bias for each averaging period is simply the difference between the survivor and grand averages. Average differences may not equal the difference between the reported survivor and grand averages due to rounding.

Table 26. Proportion of Advisory Programs in Top-, Middle-, and Bottom Third of the Price Range, Corn, and Soybeans, 1995 - 2004 Crop Years, Commercial Storage Costs

		Proportion of Programs in Price Range for 24-Month Marketing Window			Proportion of Programs in Price Range for 20-Month Marketing Window		
Crop Year	Number of Programs	Top Third or Above	Middle Third	Bottom Third or Below	Top Third or Above	Middle Third	Bottom Third or Below
			---%---			---%---	
Panel A: Corn							
1995	25	20	76	4	8	76	16
1996	26	12	65	23	8	81	12
1997	25	16	40	44	16	52	32
1998	23	0	78	22	22	65	13
1999	26	4	58	38	12	58	31
2000	27	4	85	11	52	37	11
2001	27	7	74	19	11	70	19
2002	27	44	33	22	56	30	15
2003	26	50	27	23	50	31	19
2004	27	11	89	0	19	81	0
1995-2004 Average		17	63	20	25	58	17
Panel B: Soybeans							
1995	25	36	60	4	16	80	4
1996	24	38	63	0	13	79	8
1997	23	21	58	21	21	75	4
1998	22	0	82	18	27	73	0
1999	25	32	48	20	56	32	12
2000	26	8	62	31	15	73	12
2001	26	4	35	62	12	42	46
2002	26	19	81	0	19	65	15
2003	25	8	88	4	4	92	4
2004	26	8	92	0	8	85	8
1995-2004 Average		17	67	16	19	69	12

Notes: A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest. Average proportions for 1995-2004 are computed over the full set of advisory programs. As a result, averages of individual crop year proportions may not equal the average proportions reported for 1995-2004.

Table 27. Proportion of Advisory Programs above Benchmarks for Corn, Soybeans and 50/50 Advisory Revenue, 1995 - 2004 Crop Years, Commercial Storage Costs

Crop Year	Number of Programs	Proportion of Programs Above Market Benchmark		Proportion of Programs Above Farmer Benchmark	
		24-Month Average	20-Month Average	USDA Prices	Market Prices
		---%---		---%---	---%---
Panel A: Corn					
1995	25	76	56	56	8
1996	26	38	38	73	88
1997	25	52	64	68	76
1998	23	30	57	91	100
1999	26	54	69	77	85
2000	27	56	74	78	81
2001	27	33	67	67	81
2002	27	56	63	56	63
2003	26	50	50	50	31
2004	27	70	81	78	100
1995-2004 Average		52	62	69	71
Panel B: Soybeans					
1995	25	84	72	52	36
1996	24	83	58	71	83
1997	23	57	65	74	91
1998	22	32	77	95	100
1999	25	60	96	88	88
2000	26	42	54	65	88
2001	26	77	92	27	31
2002	26	85	73	15	19
2003	25	64	56	8	0
2004	26	65	62	92	100
1995-2004 Average		65	71	58	63
Panel C: 50/50 Revenue					
1995	25	76	60	56	8
1996	24	67	54	79	83
1997	23	57	70	70	83
1998	22	27	59	100	100
1999	25	52	80	80	84
2000	26	58	69	81	85
2001	26	46	88	38	77
2002	26	77	73	50	50
2003	25	60	48	12	8
2004	26	65	77	81	100
1995-2004 Average		59	68	64	67

Notes: A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest. Average proportions for 1995-2004 are computed over the full set of advisory programs. As a result, averages of individual crop year proportions may not equal the average proportions reported for 1995-2004.

Table 28. Comparison of Average Net Advisory Prices and Benchmark Prices for Corn and Soybeans, 1995 - 2004 Crop Years, Commercial Storage Costs

Crop Year	Number of Programs	Average Net Advisory Price	Market Benchmark		Farmer Benchmark		Difference Between Advisors and Market Benchmark		Difference Between Advisors and Farmer Benchmark	
			24-Month Average	20-Month Average	USDA Prices	Market Prices	24-Month Average	20-Month Average	USDA Prices	Market Prices
			---$ per bushel (harvest equivalent)---				---¢ per bushel (harvest equivalent)---			
Panel A: Corn										
1995	25	3.03	2.90	3.07	3.06	3.32	14	-4	-3	-29
1996	26	2.63	2.65	2.66	2.50	2.42	-2	-4	12	21
1997	25	2.32	2.33	2.27	2.23	2.17	-1	4	9	15
1998	23	2.17	2.24	2.12	1.97	1.92	-8	5	20	25
1999	26	2.02	2.05	1.97	1.93	1.89	-3	5	9	13
2000	27	2.13	2.09	2.01	1.95	1.93	4	11	18	19
2001	27	1.99	2.00	1.94	1.95	1.91	-2	5	4	8
2002	27	2.15	2.10	2.09	2.11	2.08	4	6	4	6
2003	26	2.24	2.23	2.22	2.22	2.25	1	2	3	-1
2004	27	2.30	2.19	2.15	2.17	1.95	11	15	12	35
1995-2004 Average		2.29	2.28	2.25	2.21	2.18	2	5	9	11
Panel B: Soybeans										
1995	25	6.59	6.26	6.39	6.59	6.77	33	20	1	-17
1996	24	7.27	7.08	7.21	7.17	7.12	19	6	10	14
1997	23	6.38	6.30	6.22	6.17	6.08	8	16	21	30
1998	22	5.82	5.86	5.64	5.18	5.05	-4	18	64	77
1999	25	5.67	5.50	5.30	5.39	5.37	18	37	28	31
2000	26	5.44	5.42	5.38	5.29	5.23	2	6	15	21
2001	26	5.45	5.34	5.21	5.55	5.49	11	23	-10	-4
2002	26	5.24	4.98	5.10	5.41	5.40	26	14	-17	-16
2003	25	6.22	5.95	6.35	7.27	7.70	27	-13	-105	-148
2004	26	6.07	5.90	5.95	5.69	5.49	17	12	38	58
1995-2004 Average		6.00	5.86	5.88	5.97	5.97	16	14	4	4

Notes: Net advisory prices and benchmark prices are stated on a harvest equivalent basis. A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest. Averages for 1995-2004 are computed over the full set of advisory programs. As a result, averages of individual crop year prices or differences may not equal the averages reported for 1995-2004.

Table 29. Comparison of Average 50/50 Advisory Revenue and Benchmark Revenues, 1995 - 2004 Crop Years, Commercial Storage Costs

Crop Year	Number of Programs	Average Net Advisory Price	Market Benchmark		Farmer Benchmark		Difference Between Advisors and Market Benchmark		Difference Between Advisors and Farmer Benchmark	
			24-Month Average	20-Month Average	USDA Prices	Market Prices	24-Month Average	20-Month Average	USDA Prices	Market Prices
			---$ per acre (harvest equivalent)---				---$ per acre (harvest equivalent)---			
1995	25	319	304	317	320	340	15	2	-1	-21
1996	24	369	366	371	357	349	2	-2	11	19
1997	23	311	310	304	300	293	1	7	11	18
1998	22	304	311	296	274	267	-6	8	30	38
1999	25	299	297	286	285	281	2	13	14	18
2000	26	298	294	286	279	277	4	11	18	21
2001	26	287	285	277	286	281	1	9	1	5
2002	26	294	284	285	295	293	11	9	-1	1
2003	25	324	317	324	341	352	6	-1	-17	-29
2004	26	377	363	361	356	329	15	17	22	48
1995-2004 Average		318	313	311	309	306	5	7	8	12

Notes: Net advisory revenues and benchmark revenues are stated on a harvest equivalent basis. A crop year is a two-year marketing window from September of the year previous to harvest through August of the year after harvest. Averages for 1995-2004 are computed over the full set of advisory programs. As a result, averages of individual crop year revenues or differences may not equal the averages reported for 1995-2004.

Table 30. Significance Tests of Average Advisory Program Returns , Corn, Soybeans and 50/50 Advisory Revenue, 1995 - 2004 Crop Years, Commercial Storage Costs

Commodity/ Benchmark	Difference Between Average Advisory Program and Benchmark										Average Difference	Standard Error	*t*-statistic	Two-tail *p*-value
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004				
	---¢ per bushel (harvest equivalent)---										---¢ per bushel (harvest equivalent)---			
Corn														
Market Benchmarks:														
24-Month Average	14	-2	-1	-8	-3	4	-2	4	1	11	2	2	0.88	0.40
20-Month Average	-4	-4	4	5	5	11	5	6	2	15	5 *	2	2.50	0.03
Farmer Benchmarks:														
USDA Prices	-3	12	9	20	9	18	4	4	3	12	9 **	2	3.99	0.00
Market Prices	-29	21	15	25	13	19	8	6	-1	35	11	6	2.06	0.07
	---¢ per bushel (harvest equivalent)---										---¢ per bushel (harvest equivalent)---			
Soybeans														
Market Benchmarks:														
24-Month Average	33	19	8	-4	18	2	11	26	27	17	16 **	4	4.28	0.00
20-Month Average	20	6	16	18	37	6	23	14	-13	12	14 **	4	3.36	0.01
Farmer Benchmarks:														
USDA Prices	1	10	21	64	28	15	-10	-17	-105	38	4	14	0.31	0.76
Market Prices	-17	14	30	77	31	21	-4	-16	-148	58	5	19	0.24	0.82
	---$ per acre (harvest equivalent)---										---$ per acre (harvest equivalent)---			
50/50 Revenue														
Market Benchmarks:														
24-Month Average	15	2	1	-6	2	4	1	11	6	15	5 *	2	2.37	0.04
20-Month Average	2	-2	7	8	13	11	9	9	-1	17	7 **	2	3.90	0.00
Farmer Benchmarks:														
USDA Prices	-1	11	11	30	14	18	1	-1	-17	22	9	4	2.01	0.08
Market Prices	-21	19	18	38	18	21	5	1	-29	48	12	7	1.58	0.15

Notes: Two stars indicates significance at the one percent level and one star indicates significance at the five percent level.

Table 31. Significance Tests of the Average Advisory Program Percentage Returns, Corn, Soybeans and 50/50 Advisory Revenue, 1995 - 2004 Crop Years, Commercial Storage Costs

Commodity/ Benchmark	Difference Between Average Advisory Program and Benchmark										Average Difference	Standard Error	*t*-statistic	Two-tail *p*-value
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004				
	---%---										---%---			
Corn														
Market Benchmarks:														
24-Month Average	4.8	-0.9	-0.4	-3.3	-1.5	1.8	-0.9	2.1	0.5	5.0	0.7	0.9	0.83	0.43
20-Month Average	-1.1	-1.4	2.0	2.2	2.5	5.7	2.3	2.9	0.8	6.9	2.3 *	0.8	2.76	0.02
Farmer Benchmarks:														
USDA Prices	-0.9	4.9	3.8	9.9	4.7	9.0	1.9	2.0	1.2	5.7	4.2 **	1.1	3.95	0.00
Market Prices	-8.7	8.7	7.0	12.8	6.9	10.0	4.2	3.1	-0.4	18.0	6.2 *	2.3	2.66	0.03
Soybeans														
Market Benchmarks:														
24-Month Average	5.3	2.7	1.3	-0.7	3.2	0.3	2.1	5.3	4.5	3.0	2.7 **	0.6	4.25	0.00
20-Month Average	3.2	0.8	2.5	3.1	7.1	1.1	4.5	2.8	-2.0	2.0	2.5 **	0.8	3.33	0.01
Farmer Benchmarks:														
USDA Prices	0.1	1.4	3.4	12.3	5.2	2.8	-1.8	-3.1	-14.4	6.7	1.2	2.2	0.56	0.59
Market Prices	-2.6	2.0	5.0	15.3	5.8	4.0	-0.8	-3.0	-19.2	10.6	1.7	2.9	0.58	0.58
50/50 Revenue														
Market Benchmarks:														
24-Month Average	5.0	0.6	0.3	-2.0	0.6	1.4	0.4	3.7	2.0	4.0	1.6 *	0.7	2.38	0.04
20-Month Average	0.7	-0.5	2.2	2.7	4.5	3.9	3.3	3.1	-0.2	4.6	2.4 **	0.6	4.12	0.00
Farmer Benchmarks:														
USDA Prices	-0.5	3.2	3.6	11.1	4.9	6.5	0.2	-0.2	-5.1	6.1	3.0	1.4	2.06	0.07
Market Prices	-6.1	5.5	6.0	14.1	6.3	7.6	1.8	0.5	-8.1	14.6	4.2	2.4	1.77	0.11

Notes: For a given year, percentage difference is computed as the percentage difference between the average advisory price or revenue and the benchmarks. Two stars indicates significance at the one percent level and one star indicates significance at the five percent level.

Table 32. Significance Tests of Average Advisory Program Returns, Corn, Soybeans and 50/50 Advisory Revenue, 1995 - 2004 Crop Years, Commercial Storage Costs and Harvest LDP for Market Benchmarks

Commodity/ Benchmark	Difference Between Average Advisory Program and Benchmark										Average Difference	Standard Error	*t*-statistic	Two-tail *p*-value
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004				
	---¢ per bushel (harvest equivalent)---										---¢ per bushel (harvest equivalent)---			
Corn														
Market Benchmarks:														
24-Month Average	14	-2	-1	-2	-10	-7	-7	4	-1	0	-1	2	-0.54	0.60
20-Month Average	-4	-4	4	9	-2	-2	-2	6	0	3	1	1	0.58	0.57
Farmer Benchmarks:														
USDA Prices	-3	12	9	20	9	18	4	4	3	12	9 **	2	3.99	0.00
Market Prices	-29	21	15	25	13	19	8	6	-1	35	11	6	2.06	0.07
	---¢ per bushel (harvest equivalent)---										---¢ per bushel (harvest equivalent)---			
Soybeans														
Market Benchmarks:														
24-Month Average	33	19	8	11	7	-5	-7	25	27	6	12 **	4	2.94	0.02
20-Month Average	20	6	16	34	25	0	2	13	-13	0	10 *	4	2.31	0.05
Farmer Benchmarks:														
USDA Prices	1	10	21	64	28	15	-10	-17	-105	38	4	14	0.31	0.76
Market Prices	-17	14	30	77	31	21	-4	-16	-148	58	5	19	0.24	0.82
	---$ per acre (harvest equivalent)---										---$ per acre (harvest equivalent)---			
50/50 Revenue														
Market Benchmarks:														
24-Month Average	15	2	1	2	-6	-6	-8	10	5	2	2	2	0.73	0.49
20-Month Average	2	-2	7	15	4	-1	-1	8	-3	3	3	2	1.83	0.10
Farmer Benchmarks:														
USDA Prices	-1	11	11	30	14	18	1	-1	-17	22	9	4	2.01	0.08
Market Prices	-21	19	18	38	18	21	5	1	-29	48	12	7	1.58	0.15

Notes: Two stars indicates significance at the one percent level and one star indicates significance at the five percent level.

Table 33. Significance Tests of Average Advisory Program Returns , Corn, Soybeans and 50/50 Advisory Revenue, 2000 - 2004 Crop Years, On-Farm Variable Storage Costs

Commodity/ Benchmark	2000	2001	2002	2003	2004	Average Difference	Standard Error	*t* -statistic	Two-tail *p* -value
	---¢ per bushel (harvest equivalent)---					---¢ per bushel (harvest equivalent)---			
Corn									
Market Benchmarks:									
24-Month Average	6	3	5	0	14	6	2	2.40	0.07
20-Month Average	13	8	5	0	17	8 *	3	2.84	0.05
Farmer Benchmarks:									
USDA Prices	15	3	-1	-1	11	5	3	1.69	0.17
Market Prices	18	7	1	-4	34	11	7	1.64	0.18
	---¢ per bushel (harvest equivalent)---					---¢ per bushel (harvest equivalent)---			
Soybeans									
Market Benchmarks:									
24-Month Average	3	11	25	26	18	17 *	4	3.81	0.02
20-Month Average	10	23	12	-15	11	8	6	1.33	0.26
Farmer Benchmarks:									
USDA Prices	13	-13	-21	-109	36	-19	25	-0.77	0.48
Market Prices	19	-8	-20	-152	56	-21	35	-0.60	0.58
	---$ per acre (harvest equivalent)---					---$ per acre (harvest equivalent)---			
50/50 Revenue									
Market Benchmarks:									
24-Month Average	6	5	10	5	18	9 *	2	3.68	0.02
20-Month Average	13	12	7	-3	19	10	4	2.62	0.06
Farmer Benchmarks:									
USDA Prices	16	-1	-6	-21	20	1	7	0.20	0.85
Market Prices	19	4	-4	-33	46	7	13	0.50	0.64

Notes: Two stars indicates significance at the one percent level and one star indicates significance at the five percent level.

Table 34. Significance Tests of Average Advisory Program Returns , Corn, Soybeans and 50/50 Advisory Revenue, 2000- 2004 Crop Years, Commercial Storage Costs

Commodity/ Benchmark	2000	2001	2002	2003	2004	Average Difference	Standard Error	*t* -statistic	Two-tail *p* -value
	---¢ per bushel (harvest equivalent)---					---¢ per bushel (harvest equivalent)---			
Corn									
Market Benchmarks:									
24-Month Average	4	-2	4	1	11	4	2	1.75	0.15
20-Month Average	11	5	6	2	15	8 *	2	3.29	0.03
Farmer Benchmarks:									
USDA Prices	18	4	4	3	12	8 *	3	2.77	0.05
Market Prices	19	8	6	-1	35	14	6	2.17	0.10
	---¢ per bushel (harvest equivalent)---					---¢ per bushel (harvest equivalent)---			
Soybeans									
Market Benchmarks:									
24-Month Average	2	11	26	27	17	17 *	5	3.50	0.02
20-Month Average	6	23	14	-13	12	9	6	1.42	0.23
Farmer Benchmarks:									
USDA Prices	15	-10	-17	-105	38	-16	24	-0.65	0.55
Market Prices	21	-4	-16	-148	58	-18	35	-0.51	0.64
	---$ per acre (harvest equivalent)---					---$ per acre (harvest equivalent)---			
50/50 Revenue									
Market Benchmarks:									
24-Month Average	4	1	11	6	15	7 *	2	3.12	0.04
20-Month Average	11	9	9	-1	17	9 *	3	3.23	0.03
Farmer Benchmarks:									
USDA Prices	18	1	-1	-17	22	4	7	0.63	0.56
Market Prices	21	5	1	-29	48	9	13	0.75	0.50

Notes: Two stars indicates significance at the one percent level and one star indicates significance at the five percent level.

Table 35. Ten-Year Average and Standard Deviation for 15 Market Advisory Programs, Corn and Soybean Net Advisory Price and 50/50 Advisory Revenue, 1995 - 2004 Crop Years, Commercial Storage Costs

	Corn		Soybeans		50/50 Advisory Revenue	
Market Advisory Program	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
	---$ per bushel (harvest equivalent)---		---$ per bushel (harvest equivalent)---		---$ per acre (harvest equivalent)---	
Ag Review	2.37	0.23	5.56	1.05	315	41
AgLine by Doane (cash only)	2.33	0.35	6.00	0.68	320	33
AgResource	2.58	0.63	6.56	0.71	353	57
AgriVisor (aggressive cash)	2.41	0.39	6.02	0.69	326	36
AgriVisor (aggressive hedge)	2.34	0.34	6.07	0.77	322	37
AgriVisor (basic cash)	2.31	0.23	5.99	0.66	319	34
AgriVisor (basic hedge)	2.30	0.29	6.06	0.76	319	36
Allendale (futures only)	2.23	0.18	5.90	0.67	311	26
Brock (cash only)	2.28	0.29	5.93	0.59	315	34
Brock (hedge)	2.28	0.22	6.05	0.66	318	33
Freese-Notis	2.26	0.39	5.85	0.58	312	38
Pro Farmer (cash only)	2.18	0.43	6.00	0.69	307	34
Pro Farmer (hedge)	2.17	0.41	6.01	0.79	308	37
Stewart-Peterson Advisory Reports	2.20	0.33	6.01	0.65	311	37
Top Farmer Intelligence	2.30	0.33	5.96	0.53	317	26
Minimum	2.17	0.18	5.56	0.53	307	26
Maximum	2.58	0.63	6.56	1.05	353	57
Range	0.40	0.44	1.00	0.51	46	31
Randomly Selected Program	2.30	0.33	6.00	0.70	318	36
Market Benchmarks						
24-month average	2.28	0.28	5.86	0.60	313	29
20-month average	2.25 †	0.35 †	5.88	0.67	311	33
Farmer Benchmark						
USDA prices	2.21 †	0.35 †	5.97 †	0.78 †	309	32
Market prices	2.18 †	0.44 †	5.97 †	0.91 †	306	33

Note: Results are shown only for the 15 advisory programs included in all 10 years of the AgMAS corn and soybean evaluations. Net advisory prices and benchmark price are stated on a harvest equivalent basis. Consequently, advisory and benchmark revenue are also stated on a harvest equivalent basis. A crop year is a two-year window from September of the year previous to harvest through August of the year after harvest. The average price and standard deviation of a randomly selected advisory program are computed as the average across the average prices and standard deviations, respectively, for the 15 individual programs. The dagger symbol indicates a randomly selected advisory program dominates a given benchmark in terms of average price and risk.

Table 36. Predictability of Market Advisory Program Performance by Winner and Loser Categories Between Pairs of Adjacent Crop Years, Corn, Soybeans and 50/50 Revenue, 1995 - 2004 Crop Years, Commercial Storage Costs

			Corn				Soybeans				50/50 Revenue			
Year *t*	Year *t+1*		Winner *t+1*	Loser t+*1*	Two-tail *p* -value for Fisher's Exact Test		Winner *t+1*	Loser t+*1*	Two-tail *p* -value for Fisher's Exact Test		Winner *t+1*	Loser t+*1*	Two-tail *p* -value for Fisher's Exact Test
			---number of programs---				---number of programs---				---number of programs---		
1995	1996	**Winner *t***	5	6		**Winner *t***	6	5		**Winner *t***	7	4	
		Loser *t*	6	5	1.00	**Loser *t***	5	6	1.00	**Loser *t***	4	7	0.39
1996	1997	**Winner *t***	7	5		**Winner *t***	6	5		**Winner *t***	6	5	
		Loser *t*	5	7	0.68	**Loser *t***	5	6	1.00	**Loser *t***	5	6	1.00
1997	1998	**Winner *t***	7	5		**Winner *t***	6	5		**Winner *t***	5	6	
		Loser *t*	5	6	0.68	**Loser *t***	5	5	1.00	**Loser *t***	6	4	0.67
1998	1999	**Winner *t***	7	4		**Winner *t***	7	4		**Winner *t***	7	4	
		Loser *t*	4	7	0.39	**Loser *t***	4	6	0.39	**Loser *t***	4	6	0.39
1999	2000	**Winner *t***	10	3		**Winner *t***	8	4		**Winner *t***	9	3	
		Loser *t*	3	9	0.02 *	**Loser *t***	4	8	0.22	**Loser *t***	3	9	0.04 *
2000	2001	**Winner *t***	4	8		**Winner *t***	6	6		**Winner *t***	6	6	
		Loser *t*	8	4	0.22	**Loser *t***	7	4	0.68	**Loser *t***	6	5	1.00
2001	2002	**Winner *t***	6	8		**Winner *t***	5	9		**Winner *t***	7	6	
		Loser *t*	8	5	0.45	**Loser *t***	8	4	0.24	**Loser *t***	6	7	1.00
2002	2003	**Winner *t***	9	4		**Winner *t***	11	5		**Winner *t***	7	6	
		Loser *t*	4	9	0.12	**Loser *t***	2	7	0.04	**Loser *t***	6	6	1.00
2003	2004	**Winner *t***	9	4		**Winner *t***	8	4		**Winner *t***	9	3	
		Loser *t*	4	8	0.12	**Loser *t***	4	8	0.22	**Loser *t***	3	9	0.04 *
1995-2004 Pooled		**Winner *t***	64	47		**Winner *t***	63	47		**Winner *t***	63	43	
		Loser *t*	47	60	0.06	**Loser *t***	44	54	0.10	**Loser *t***	43	59	0.02 *

Note: The selection strategy consists of ranking programs by net advisory price in the first year of the pair (e.g.*t* = 1995) and then forming two groups of programs: "winners" are those services in the top half of the rankings and "losers" are services in the bottom half. Next, the same programs are ranked by net advisory price for the second year of the pair (e.g.*t+1* = 1996), and again divided into "winners" and "losers." For a given comparison, advisory programs must fall in one of the following categories: winner *t* -winner *t+1* , winner t-loser *t+1* , loser *t* -winner *t+1* , loser *t* -loser *t+1* . If advisory program performance is unpredictable, approximately the same counts will be found in each of the four combinations. Fisher's Exact Test is the appropriate statistical test because both row and column totals are pre-determined in the 2 x 2 contingency table formed on the basis of winner and loser counts. Two stars indicates significance at the one percent level and one star indicates significance at the five percent level.

Table 37. Predictability of Market Advisory Program Ranks Between Adjacent Pairs of Crop Years, Corn, Soybeans and 50/50 Revenue, 1995-2004 Crop Years, Commercial Storage Costs

Year *t*	Year *t+1*		Rank Correlation Corn	Soybeans	50/50 Revenue
1995	1996	Correlation	0.28	0.36	0.36
		z -statistic	1.30	1.70	1.68
		Two-tail *p* -value	0.19	0.09	0.09
1996	1997	Correlation	0.01	0.10	0.00
		z -statistic	0.04	0.48	0.00
		Two-tail *p* -value	0.97	0.63	1.00
1997	1998	Correlation	0.51 **	0.17	0.16
		z -statistic	2.45	0.78	0.73
		Two-tail *p* -value	0.01	0.44	0.47
1998	1999	Correlation	0.41 *	0.63 **	0.55 **
		z -statistic	1.93	2.91	2.51
		Two-tail *p* -value	0.05	0.00	0.01
1999	2000	Correlation	0.50 **	0.35	0.72 **
		z -statistic	2.48	1.73	3.54
		Two-tail *p* -value	0.01	0.08	0.00
2000	2001	Correlation	-0.10	0.02	-0.16
		z -statistic	-0.51	0.09	-0.76
		Two-tail *p* -value	0.61	0.93	0.45
2001	2002	Correlation	-0.06	0.04	0.08
		z -statistic	-0.29	0.20	0.40
		Two-tail *p* -value	0.77	0.84	0.69
2002	2003	Correlation	0.49 *	0.19	0.25
		z -statistic	2.51	0.93	1.26
		Two-tail *p* -value	0.01	0.35	0.21
2003	2004	Correlation	0.40 *	0.40	0.54 **
		z -statistic	2.01	1.98	2.64
		Two-tail *p* -value	0.04	0.05	0.01
1995-2004 Average		Correlation	0.27	0.25	0.28

Note: Return correlations are based on the 24-month average market benchmark price or revenue, with the return for each service computed as the continuously-compounded rate of return (natural logarithm of the ratio of net advisory price to the benchmark price or revenue). Two stars indicates significance at the one percent level and one star indicates significance at the five percent level.

Table 38. Predictability of Market Advisory Program Performance by Quantiles Between Pairs of Adjacent Crop Years, Corn, Soybeans and 50/50 Revenue, 1995-2004 Crop Years, Commercial Storage Costs

	Corn		Soybeans		50/50 Revenue	
Performance Quantile in Year *t*	**Average Price in year *t***	**Average Price in year *t* +1**	**Average Price in year *t***	**Average Price in year *t* +1**	**Average Revenue in year *t***	**Average Revenue in year *t* +1**
	---$ per bushel (harvest equivalent)---		---$ per bushel (harvest equivalent)---		---$ per acre (harvest equivalent)---	
Top Third	2.49	2.27	6.38	6.09	330	325
Middle Third	2.31	2.23	6.00	5.90	312	316
Bottom Third	2.11	2.17	5.66	5.84	294	314
Top Third minus Bottom Third						
Average	0.38	0.10 **	0.72	0.25 **	37	11 *
t -statistic	N/A	3.17	N/A	3.44	N/A	2.59
Two-tail *p* -value	N/A	0.01	N/A	0.01	N/A	0.03
Top Fourth	2.53	2.29	6.40	6.12	333	326
Second Fourth	2.35	2.23	6.10	5.90	316	319
Third Fourth	2.26	2.22	5.91	5.97	308	317
Bottom Fourth	2.08	2.15	5.61	5.81	291	311
Top Fourth minus Bottom Fourth						
Average	0.45	0.14 **	0.79	0.31 **	42	16 **
t -statistic	N/A	3.57	N/A	3.18	N/A	3.15
Two-tail *p* -value	N/A	0.01	N/A	0.01	N/A	0.01
Top 2 Programs	2.70	2.33	6.77	6.33	353	341
Bottom 2 Programs	1.96	2.15	5.38	5.93	281	310
Top 2 minus Bottom 2						
Average	0.74	0.19	1.38	0.40 **	72	30 *
t -statistic	N/A	1.63	N/A	3.06	N/A	2.61
Two-tail *p* -value	N/A	0.14	N/A	0.02	N/A	0.03

Note: The selection strategy consists of sorting programs by net advisory price in the first year of the pair (e.g.,*t* = 1995) and forming groups of programs (thirds, fourths, top two and bottom two). Next, the average net advisory price for each group is computed for the first year of the pair. Then, the average net advisory price of the group formed in the first year is computed for the second year of the pair (e.g.,*t+1* = 1996). Next, the average net advisory price for the second year is averaged across the comparisons. There are a total of nine comparisons (1995 vs. 1996, 1996 vs. 1997, 1997 vs. 1998, 1998 vs. 1999, 1999 vs. 2000, 2000 vs. 2001, 2001 vs. 2002, 2002 vs. 2003, and 2003 vs. 2004), so there are eight degrees of freedom for the *t* -test. Some average differences of the top and bottom groups may not equal the difference of the averages for the groups due to rounding. N/A denotes "Not Applicable." Two stars indicates significance at the one percent level and one star indicates significance at the five percent level

Table 39. Predictability of Market Advisory Program Performance by Quantiles Between Pairs of Non-Overlapping Crop Years, Corn, Soybeans and 50/50 Revenue, 1995-2004 Crop Years, Commercial Storage Costs

	Corn		Soybeans		50/50 Revenue	
Performance Quantile in Year *t*	**Average Price in year *t***	**Average Price in year *t*+2**	**Average Price in year *t***	**Average Price in year *t*+2**	**Average Revenue in year *t***	**Average Revenue in year *t*+2**
	---$ per bushel (harvest equivalent)---		---$ per bushel (harvest equivalent)---		---$ per acre (harvest equivalent)---	
Top Third	2.50	2.18	6.32	5.84	328	313
Middle Third	2.32	2.18	5.95	5.78	311	310
Bottom Third	2.11	2.14	5.69	5.72	292	312
Top Third minus Bottom Third						
Average	0.40	0.03	0.62	0.12	37	1
t-statistic	N/A	0.83	N/A	1.07	N/A	0.30
Two-tail *p*-value	N/A	0.43	N/A	0.32	N/A	0.77
Top Fourth	2.55	2.17	6.40	5.87	333	314
Second Fourth	2.37	2.21	6.03	5.78	314	312
Third Fourth	2.27	2.13	5.88	5.76	306	309
Bottom Fourth	2.06	2.17	5.66	5.73	289	313
Top Fourth minus Bottom Fourth						
Average	0.48	0.01	0.75	0.14	44	1
t-statistic	N/A	0.11	N/A	1.26	N/A	0.25
Two-tail *p*-value	N/A	0.91	N/A	0.25	N/A	0.81
Top 2 Programs	2.70	2.15	6.67	5.94	350	319
Bottom 2 Programs	1.95	2.22	5.51	5.94	280	312
Top 2 minus Bottom 2						
Average	0.75	-0.06	1.17	0.00	70	6
t-statistic	N/A	-0.80	N/A	-0.02	N/A	0.67
Two-tail *p*-value	N/A	0.45	N/A	0.99	N/A	0.53

Note: The selection strategy consists of sorting programs by net advisory price in the first year of the pair (e.g.,*t* = 1995) and forming groups of programs (thirds, fourths, top two and bottom two). Next, the average net advisory price for each group is computed for the first year of the pair. Then, the average net advisory price of the group formed in the first year is computed for the second year of the pair (e.g.,*t+2* = 1997). Next, the average net advisory price for the second year is averaged across the comparisons. There are a total of eight comparisons (1995 vs. 1997, 1996 vs. 1998, 1997 vs. 1999, 1998 vs. 2000, 1999 vs. 2001, 2000 vs. 2002, 2001 vs. 2003, and 2002 vs. 2004), so there are seven degrees of freedom for the *t*-test. Some average differences of the top and bottom groups may not equal the difference of the averages for the groups due to rounding. N/A denotes "Not Applicable."

Table 40. Predictability of Market Advisory Program Performance Between the 1995-1998 and 2000-2004 Crop Years by Groups, Corn, Soybeans and 50/50 Revenue, Commercial Storage Costs

Performance Group in 1995-1998	Corn		Soybeans		50/50 Revenue	
	Average Price 1995-1998	Average Price 2000-2004	Average Price 1995-1998	Average Price 2000-2004	Average Revenue 1995-1998	Average Revenue 2000-2004
	---$ per bushel (harvest equivalent)---		---$ per bushel (harvest equivalent)---		---$ per acre (harvest equivalent)---	
Top Third	2.63	2.18	6.59	5.82	332	323
Middle Third	2.51	2.19	6.48	5.66	323	313
Bottom Third	2.42	2.17	6.35	5.54	316	315
Top Third minus Bottom Third	0.21	0.00	0.24	0.27	16	8
Top Fourth	2.67	2.23	6.62	5.87	335	323
Second Fourth	2.54	2.13	6.52	5.59	324	313
Third Fourth	2.47	2.20	6.40	5.67	320	319
Bottom Fourth	2.39	2.15	6.34	5.53	315	312
Top Fourth minus Bottom Fourth	0.28	0.08	0.28	0.34	20	10
Top Two Programs	2.76	2.31	6.68	5.94	341	338
Bottom Two Programs	2.36	2.13	6.33	5.48	314	310
Top Two minus Bottom Two	0.40	0.18	0.35	0.46	27	28

Note: Results are shown only for the 15 advisory programs included in all 10 years of the AgMAS corn and soybean evaluations. The selection strategy consists of sorting the 15 programs by average net advisory price over 1995-1998 and forming groups of programs (thirds, fourths, top two and bottom two). Next, the average net advisory price for each group is computed for 1995-1998. Then, the average net advisory price of the group formed over 1995-1998 is computed for 2000-2004. Since there is only one pair of observations in each case, statistical tests cannot be applied.

Table 41. Predictability of Market Advisory Program Performance Between the 1995-1999 and 2001-2004 Crop Years by Groups, Corn, Soybeans and 50/50 Revenue, Commercial Storage Costs

Performance Group in 1995-1998	Corn		Soybeans		50/50 Revenue	
	Average Price 1995-1999	Average Price 2001-2004	Average Price 1995-1999	Average Price 2001-2004	Average Revenue 1995-1999	Average Revenue 2001-2004
	---$ per bushel (harvest equivalent)---		---$ per bushel (harvest equivalent)---		---$ per acre (harvest equivalent)---	
Top Third	2.52	2.26	6.48	5.70	327	329
Middle Third	2.40	2.19	6.32	5.80	317	318
Bottom Third	2.33	2.11	6.15	5.66	313	316
Top Third minus Bottom Third	0.19	0.15	0.33	0.04	14	11
Top Fourth	2.57	2.26	6.54	5.77	331	329
Second Fourth	2.41	2.19	6.33	5.71	318	319
Third Fourth	2.38	2.16	6.25	5.81	315	322
Bottom Fourth	2.32	2.12	6.11	5.54	312	313
Top Fourth minus Bottom Fourth	0.26	0.14	0.44	0.23	19	15
Top Two Programs	2.67	2.26	6.64	5.93	340	337
Bottom Two Programs	2.30	2.16	6.07	5.34	311	315
Top Two minus Bottom Two	0.37	0.10	0.57	0.58	29	22

Note: Results are shown only for the 15 advisory programs included in all 10 years of the AgMAS corn and soybean evaluations. The selection strategy consists of sorting the 15 programs by average net advisory price over 1995-1999 and forming groups of programs (thirds, fourths, top two and bottom two). Next, the average net advisory price for each group is computed for 1995-1999. Then, the average net advisory price of the group formed over 1995-1999 is computed for 2001-2004. Since there is only one pair of observations in each case, statistical tests cannot be applied.

Table 42. Comparison of Average Price or Revenue between Futures and Options Advisory Programs and Cash Only Programs, Corn, Soybeans and 50/50 Revenue, 1995-2004 Crop Years, Commercial Storage Costs

Commodity/ Program Category	Number of Programs	Average Net Advisory Price or Revenue											Standard		Two-tail
		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Average	Error	*t*-statistic	*p*-value
		---$ per bushel (harvest equivalent)---													
Corn:															
Futures and Options Programs	32	3.04	2.61	2.33	2.16	2.03	2.14	1.99	2.13	2.24	2.32	2.30			
Cash Only Programs	9	3.01	2.68	2.30	2.18	2.01	2.09	1.96	2.21	2.24	2.23	2.29			
Difference		0.03	-0.08	0.03	-0.02	0.01	0.05	0.04	-0.08	0.00	0.09	0.01	0.02	0.47	0.65
		---$ per bushel (harvest equivalent)---													
Soybeans:															
Futures and Options Programs	31	6.64	7.28	6.42	5.87	5.74	5.48	5.44	5.22	6.18	6.08	6.04			
Cash Only Programs	9	6.47	7.24	6.28	5.68	5.51	5.34	5.46	5.31	6.36	6.05	5.97			
Difference		0.16	0.04	0.14	0.18	0.23	0.13	-0.02	-0.08	-0.17	0.04	0.07	0.04	1.62	0.14
		---$ per acre (harvest equivalent)---													
50/50 Revenue:															
Futures and Options Programs	31	321	367	312	305	300	300	287	293	323	380	319			
Cash Only Programs	9	315	372	307	302	294	292	285	300	326	371	316			
Difference		5	-6	5	3	7	8	2	-7	-3	9	2	2	1.34	0.21

Notes: Advisory programs are categorized as "futures and options programs" and "cash only programs" based on the names provided by advisory services. Some cash only programs actually may occasionally recommend futures and options positions. The difference for a given crop year may not equal the differnce for the reported prices or revenues due to rounding.

Figure 1. Distribution of Track Record Lengths for Corn and Soybean Market Advisory Programs, 1995-2004

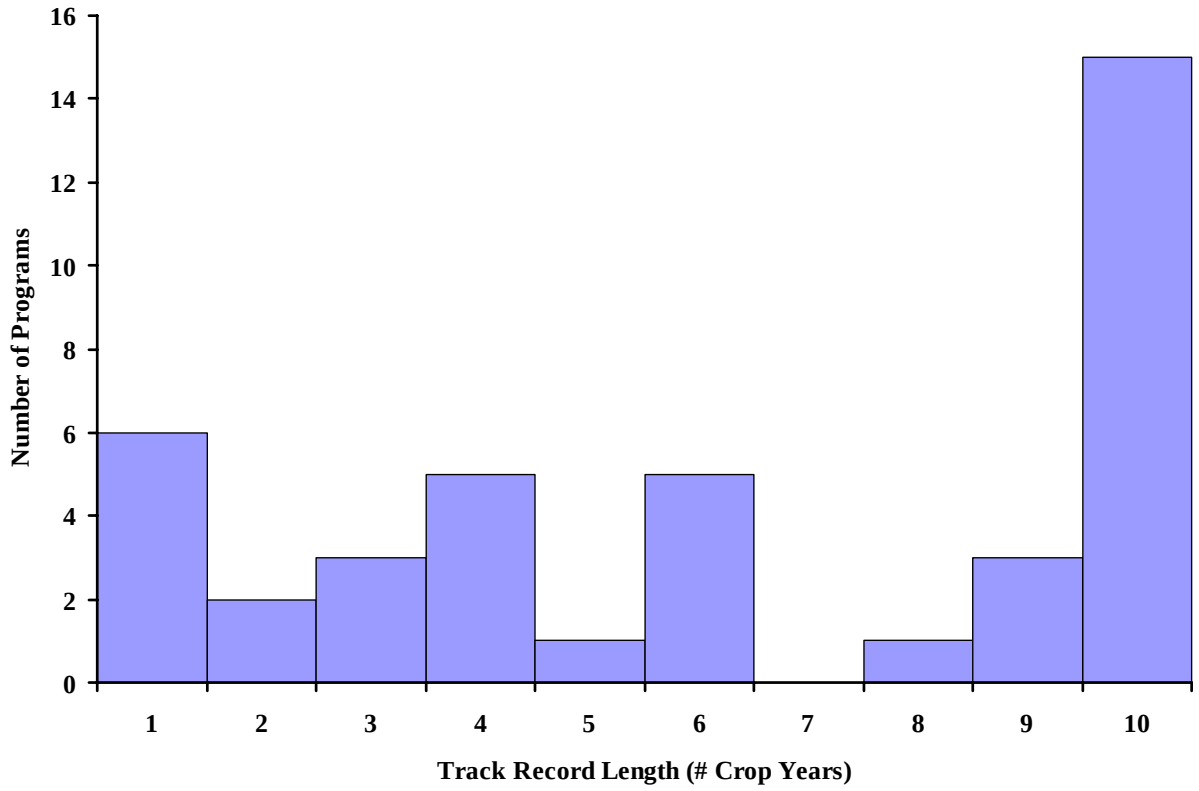
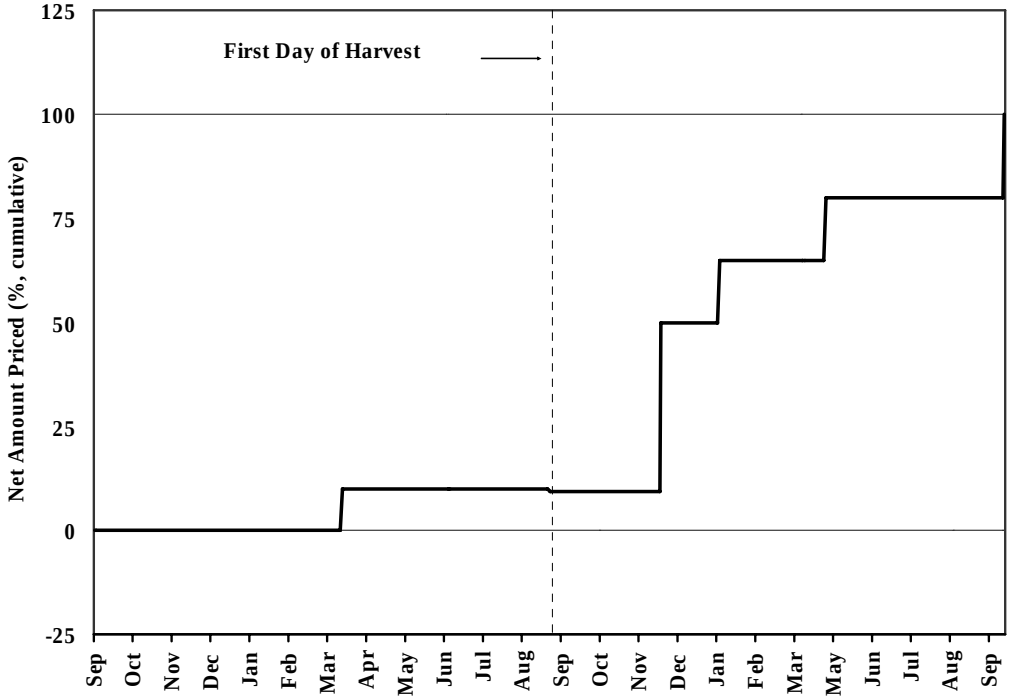


Figure 2. Marketing Profile Examples for Advisory Programs in Corn, 2000 Crop Year

Panel A. Conservative Program



Panel B: Aggressive Program

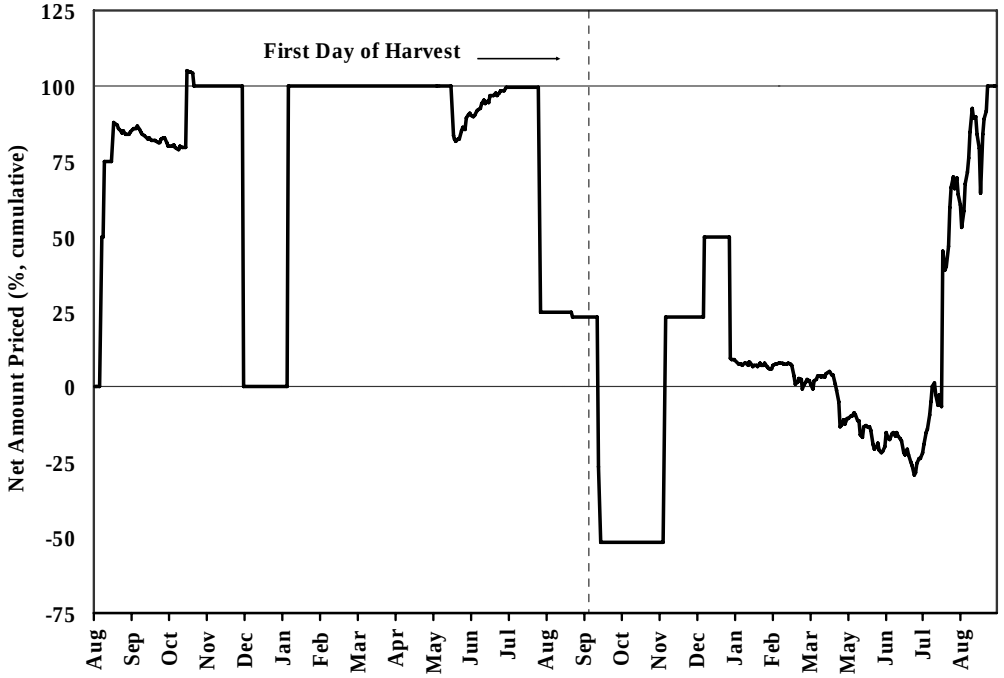
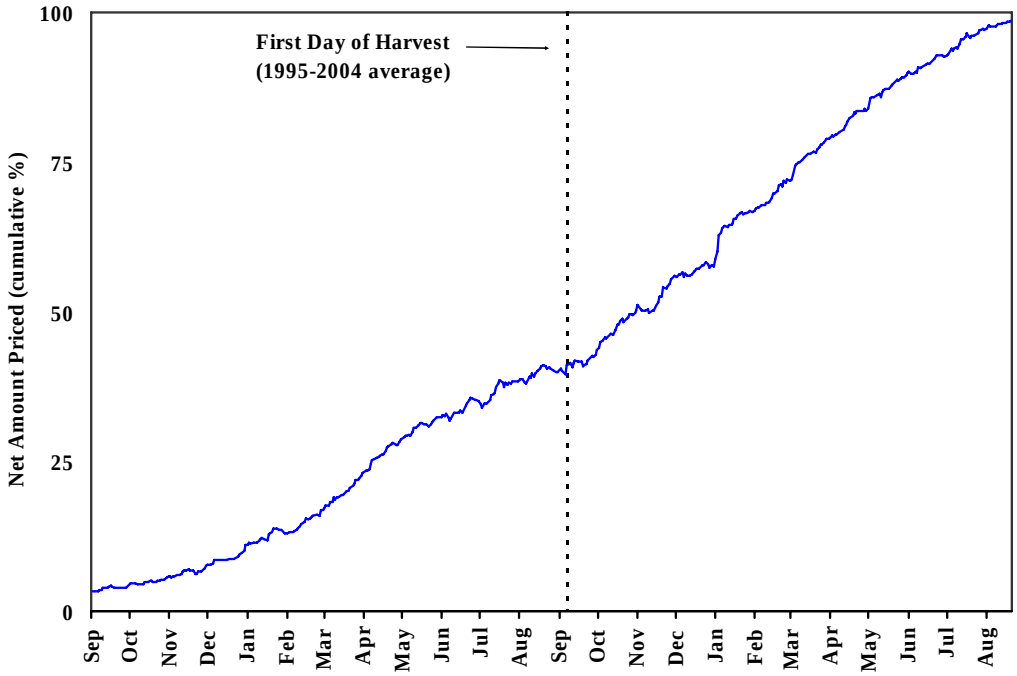


Figure 3. Average Marketing Profiles for Advisory Programs, Corn and Soybeans, 1995 - 2004 Crop Years

Panel A: Corn



Panel B: Soybeans

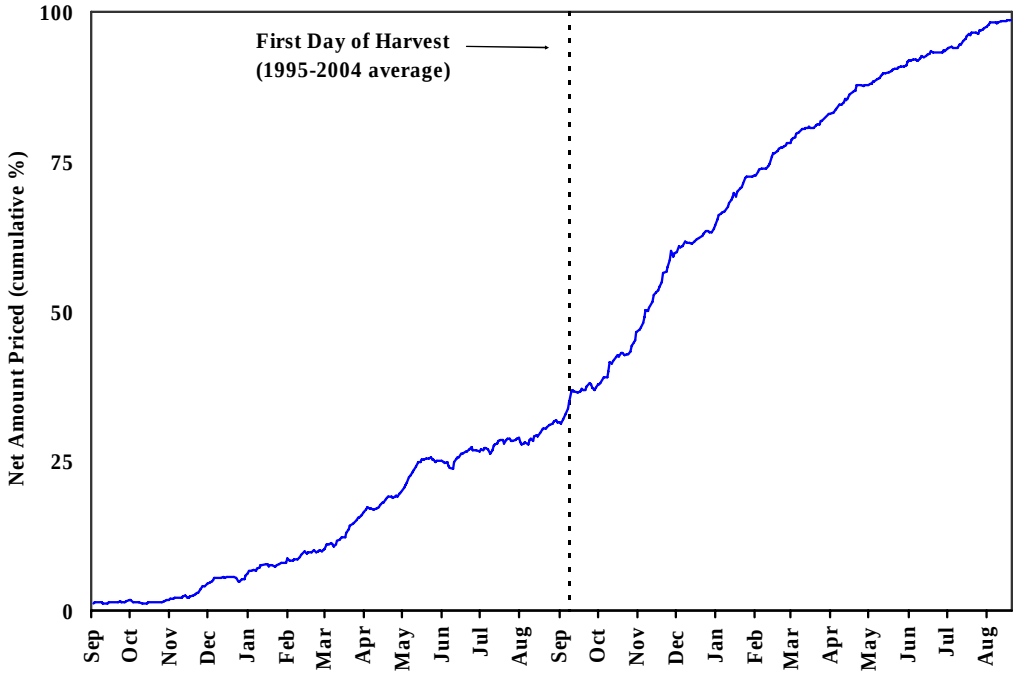


Figure 4. Central Illinois Crop Reporting District

Figure 5. Central Illinois Price Reporting District

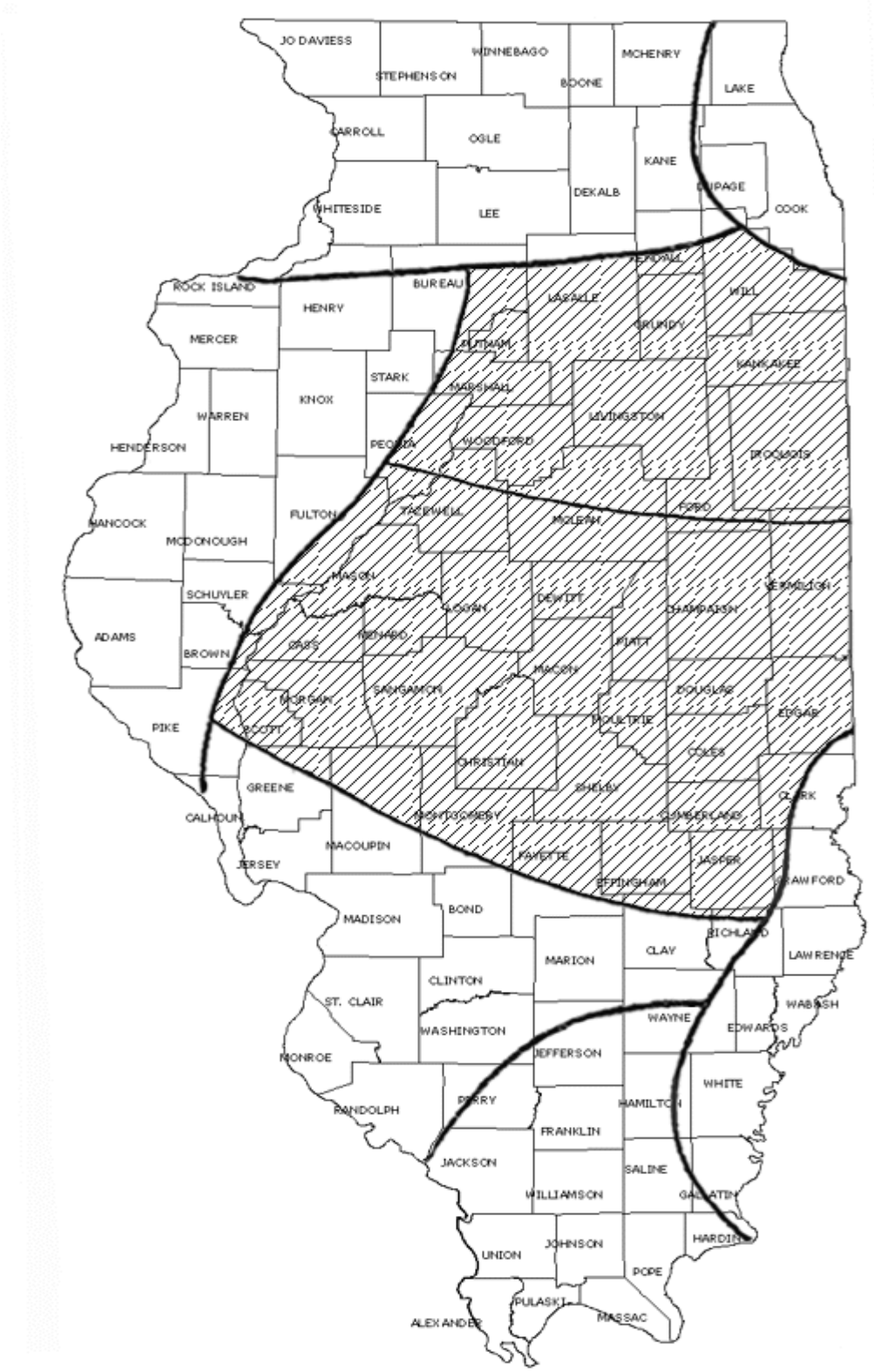
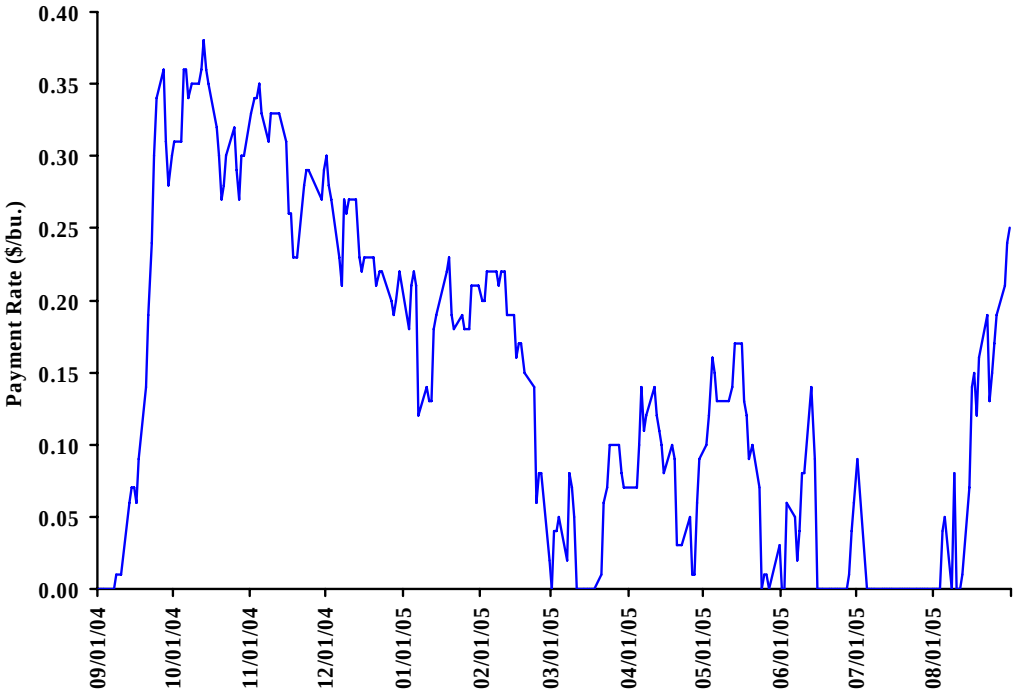


Figure 6. Loan Deficiency Payment (LDP) and Marketing Loan Gain (MLG) Rates for Corn and Soybeans, Central Illinois, 2004 Crop Year

Panel A: Corn



Panel B: Soybeans

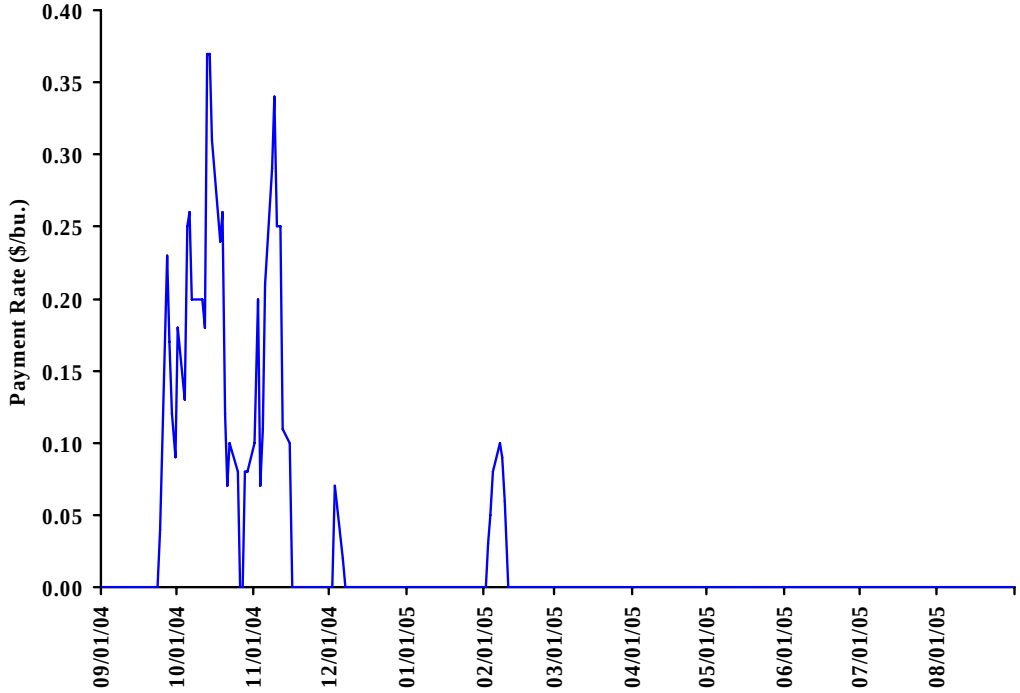
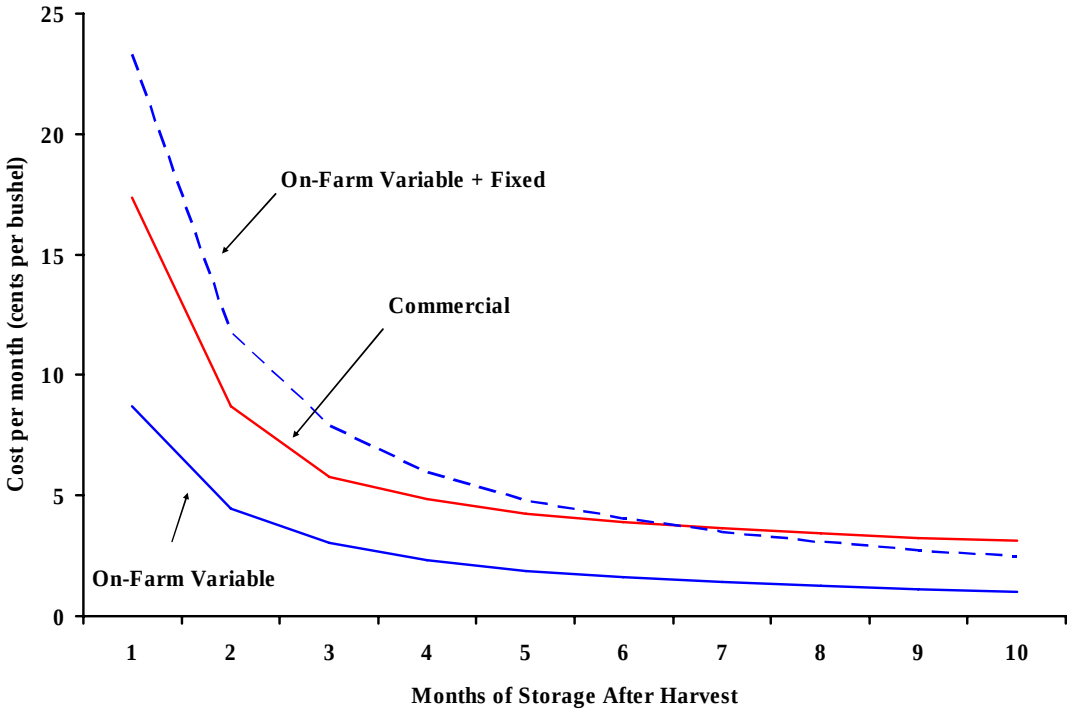


Figure 7. Comparison of Storage Costs for Corn and Soybeans, Central Illinois, 2004 Crop Year

Panel A: Corn



Panel B: Soybeans

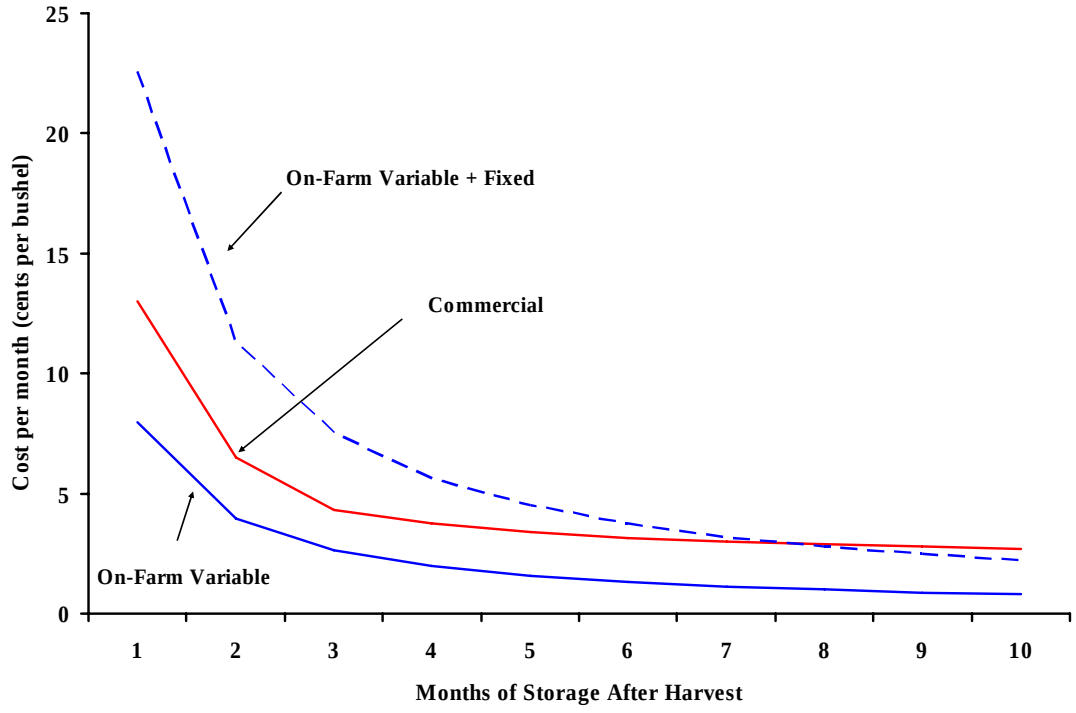


Figure 8. An Example of Computating the Net Advisory Price for Soybeans, 2004 Crop Year

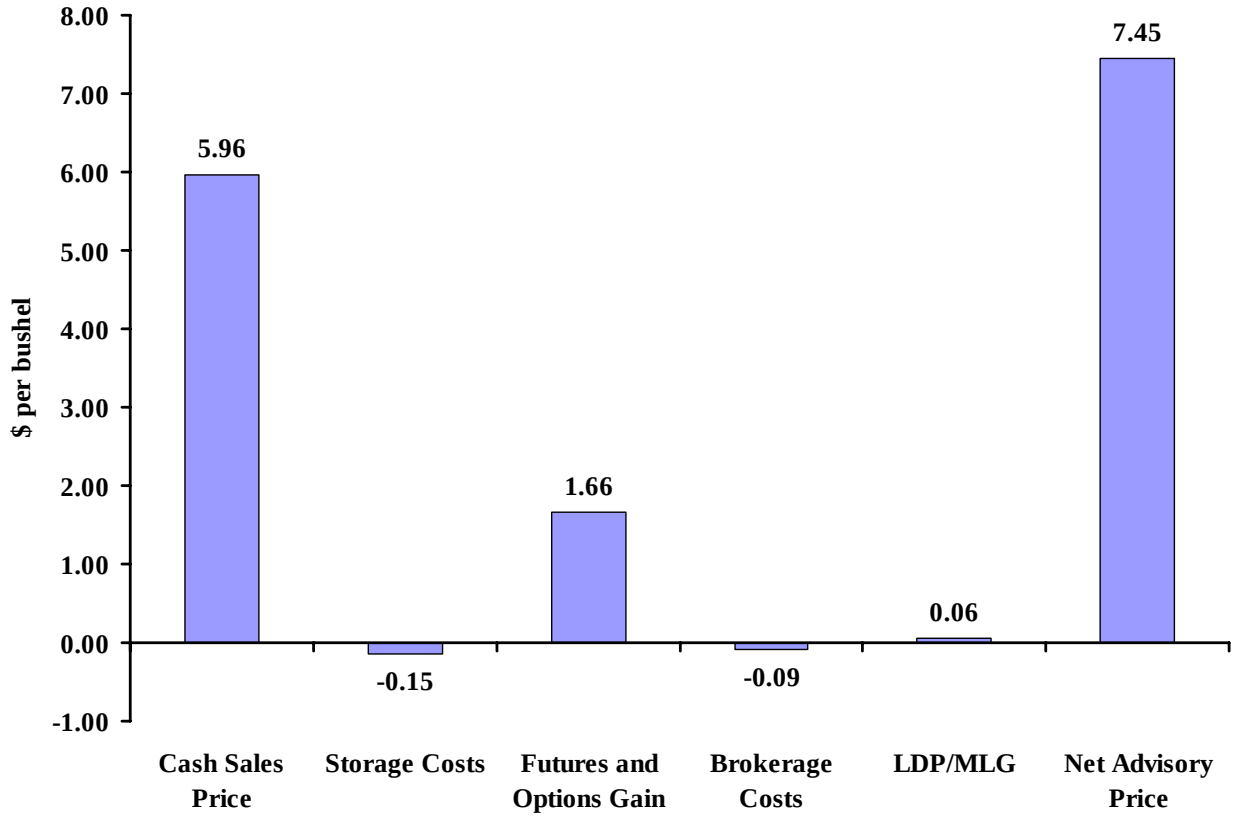
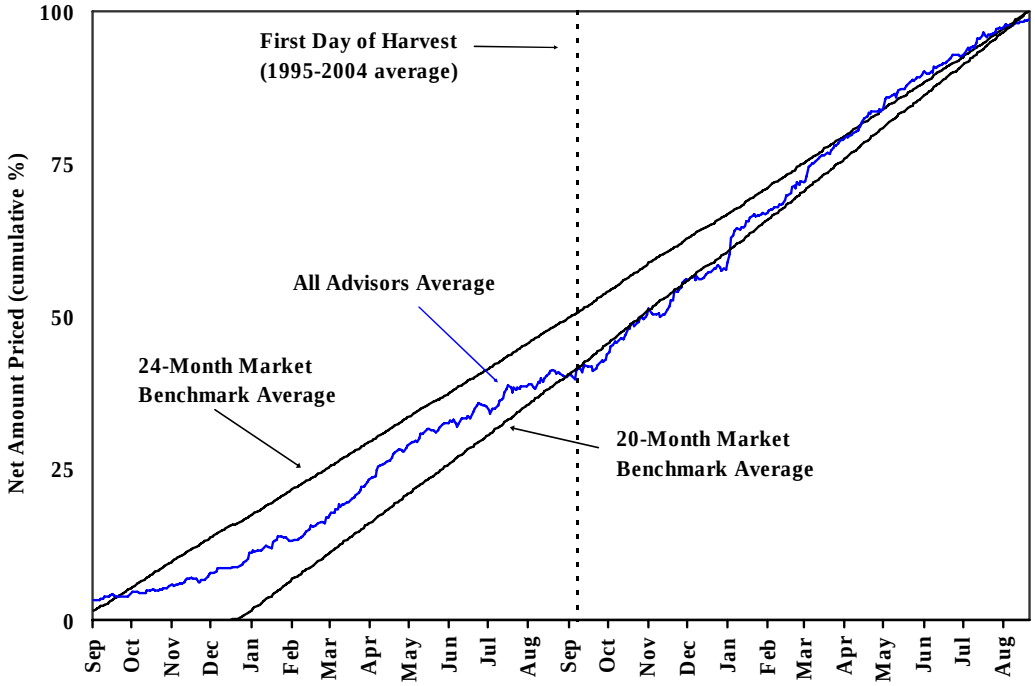


Figure 9. Average Marketing Profiles for Advisory Programs and Market Benchmarks, Corn and Soybeans, 1995 - 2004 Crop Years

Panel A: Corn



Panel B: Soybeans

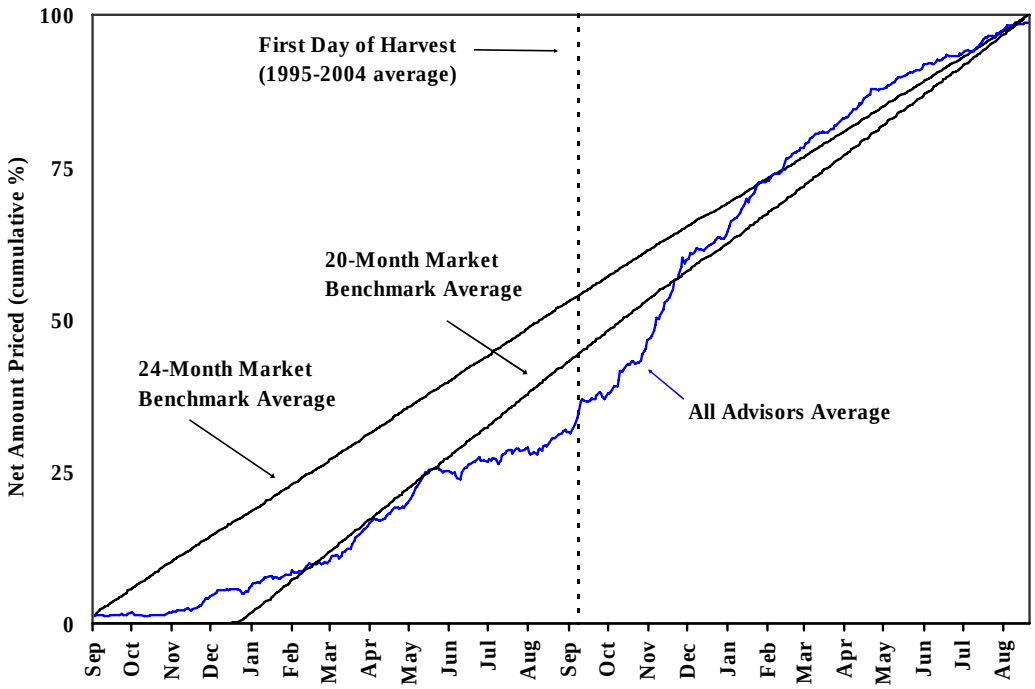
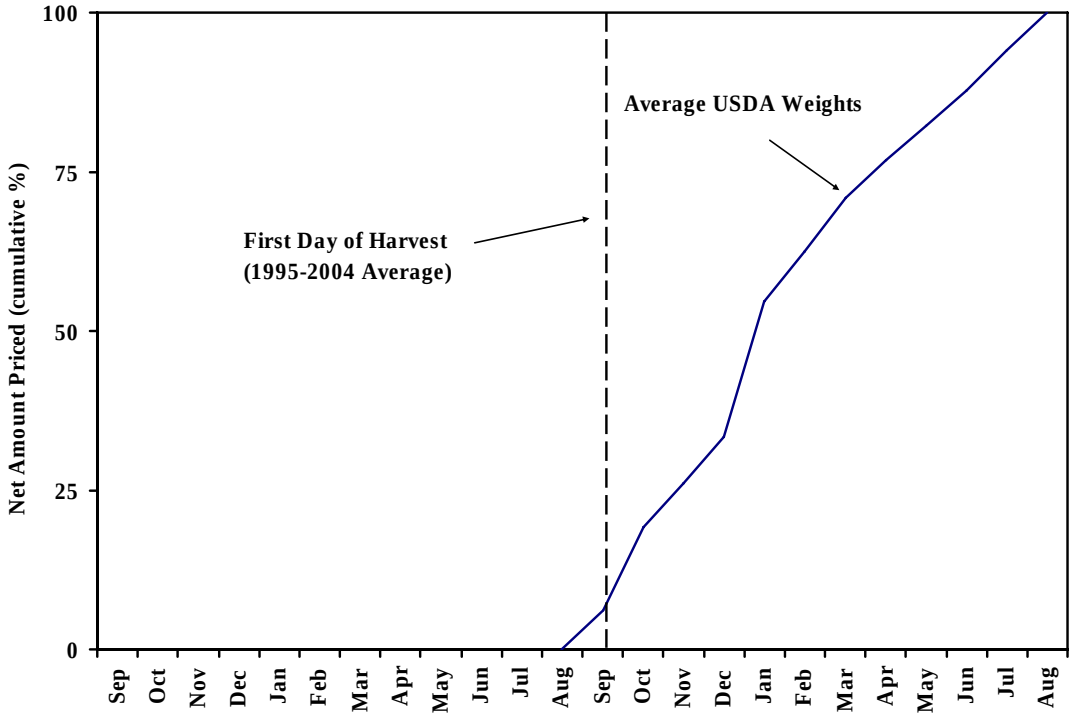


Figure 10. Average USDA Marketing Weights for Illinois, Corn and Soybeans, 1995 - 2004 Crop Years

Panel A: Corn



Panel B: Soybeans

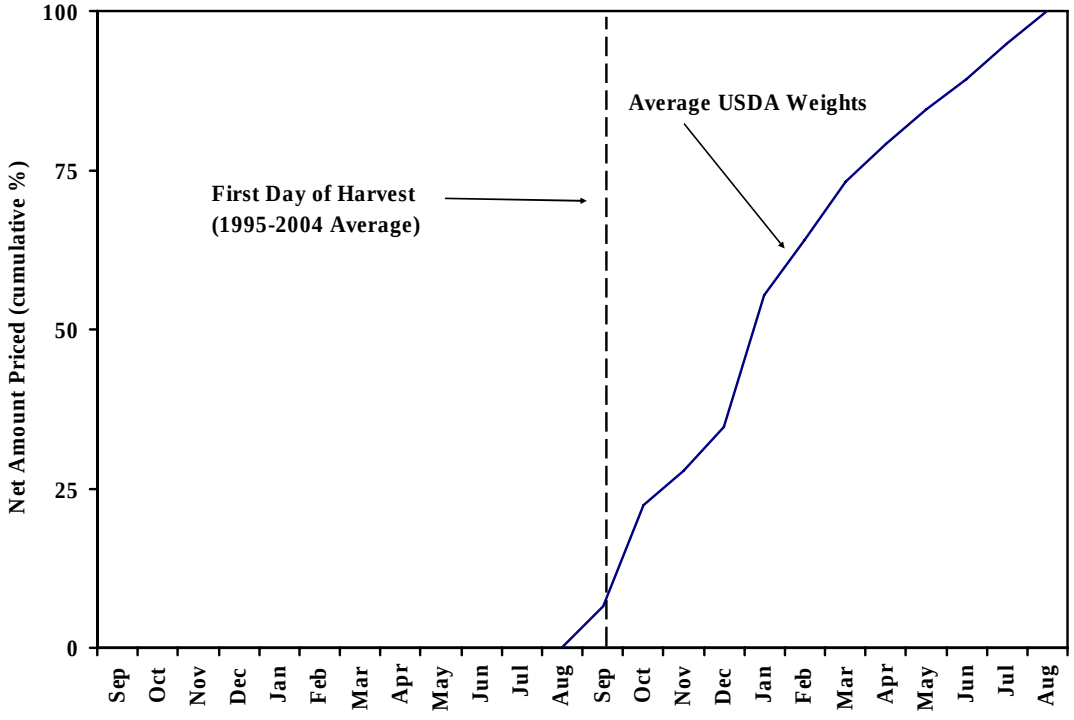


Figure 11. Daily Corn Prices, Central Illinois, 2004 Crop Year, On-Farm Variable Storage Costs

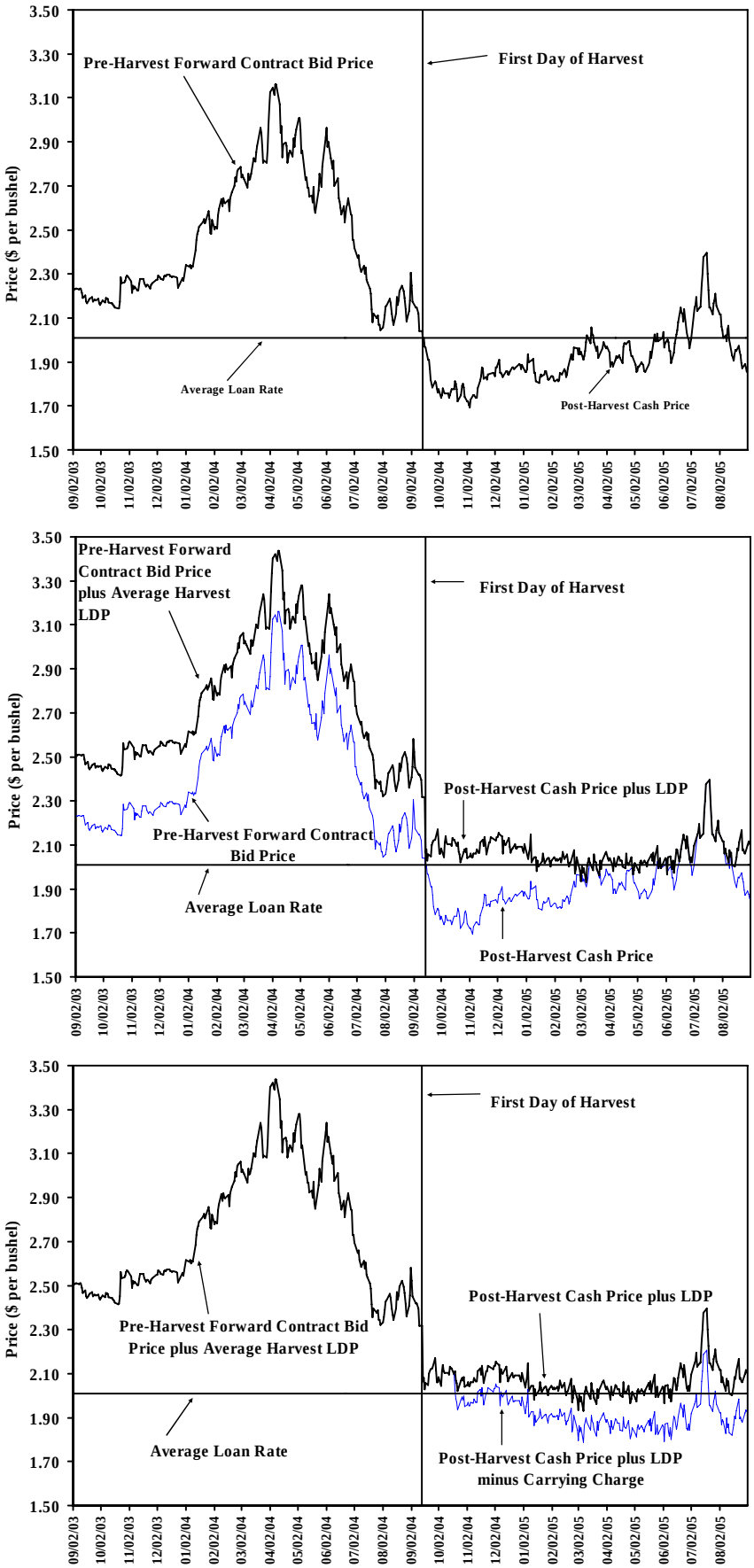


Figure 12. Daily Corn Prices, Central Illinois, 2004 Crop Year, Commercial Storage Costs

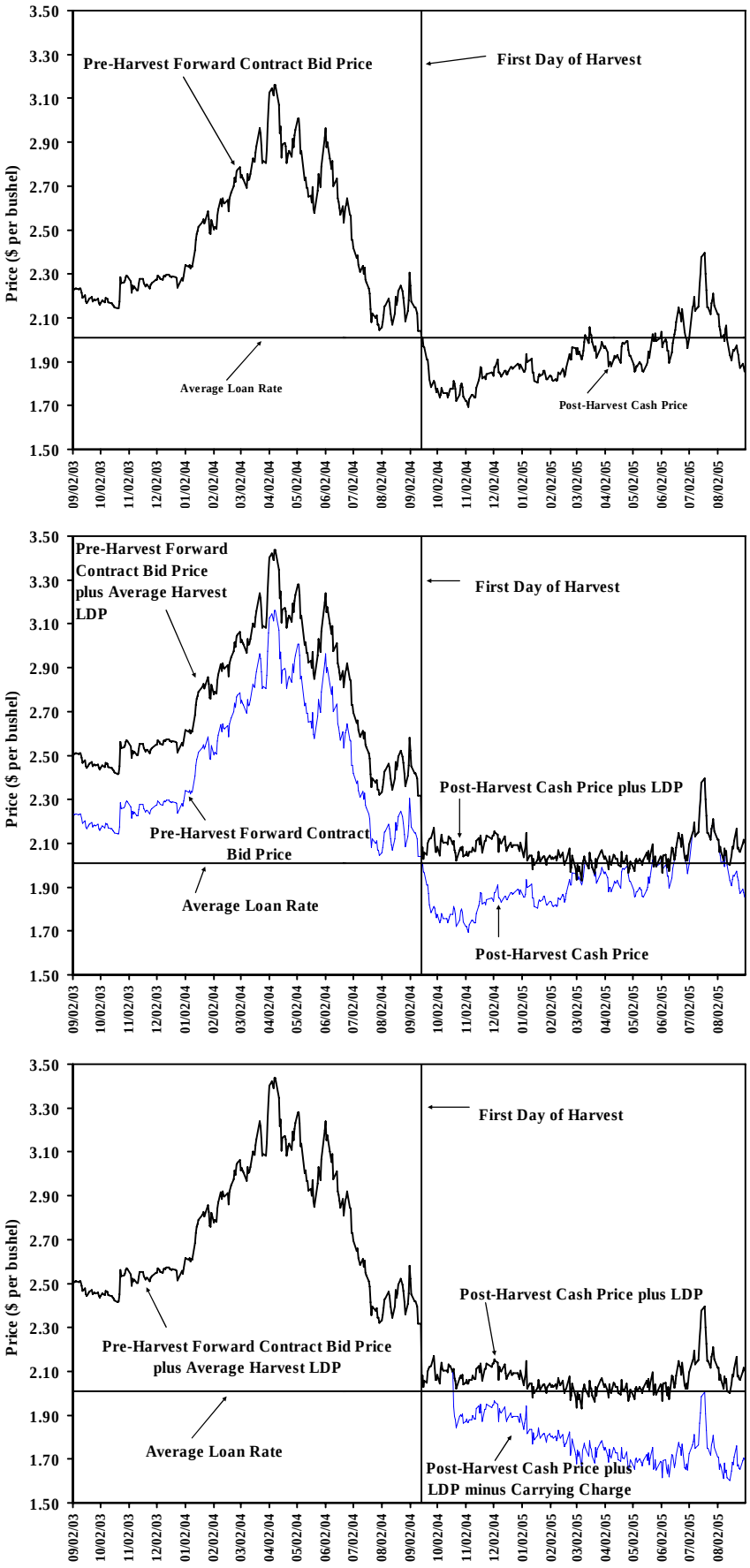


Figure 13. Daily Soybean Prices, Central Illinois, 2004 Crop Year, On-Farm Variable Storage Costs

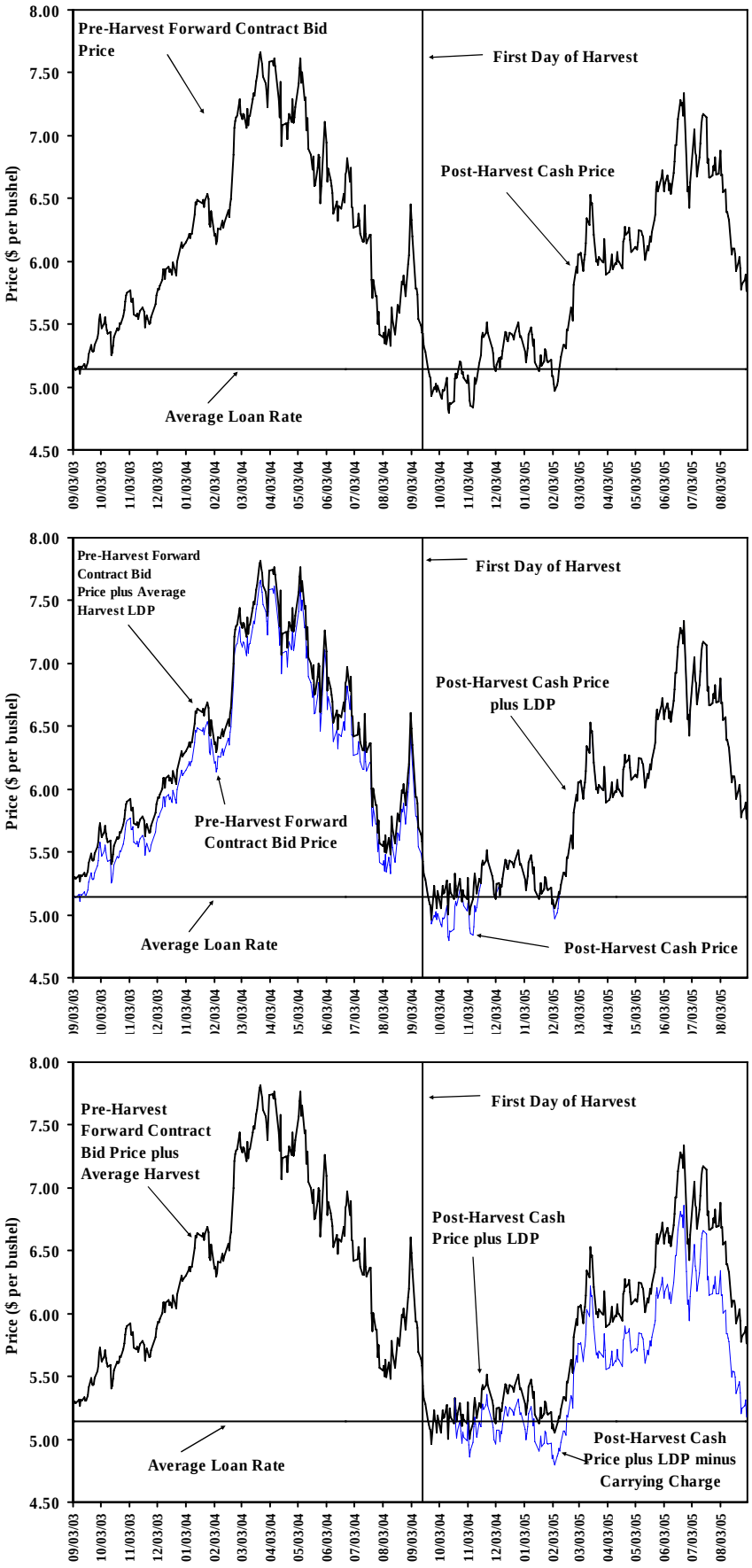


Figure 14. Daily Soybean Prices, Central Illinois, 2004 Crop Year, Commercial Storage Costs

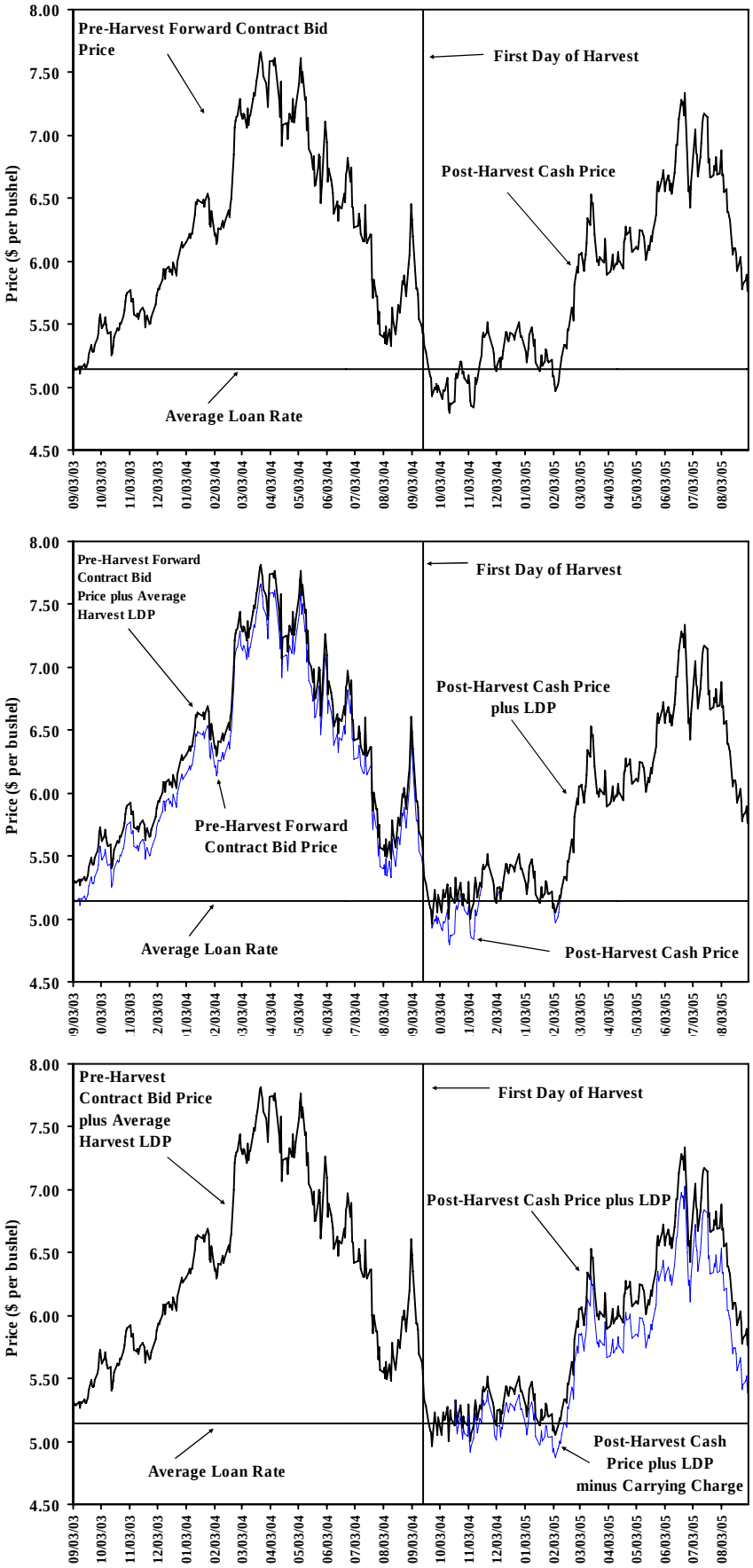
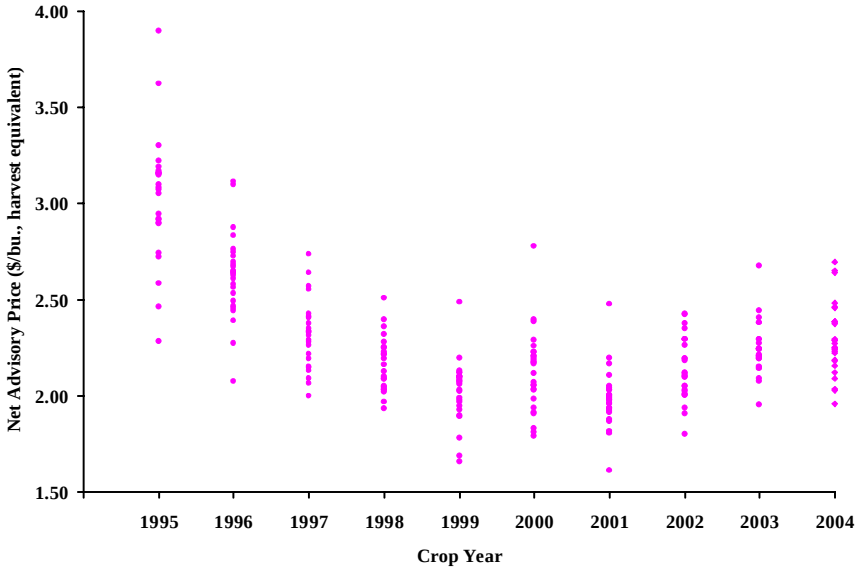
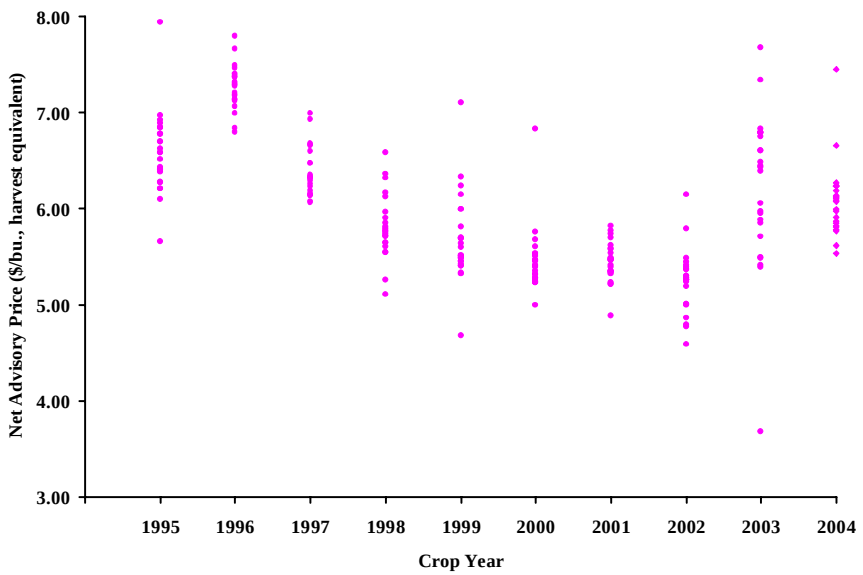


Figure 15. Distribution of Advisory Program Prices or Revenues over the 1995-2004 Crop Years, Commercial Storage Costs

Panel A: Corn



Panel B: Soybeans



Panel C: 50/50 Revenue

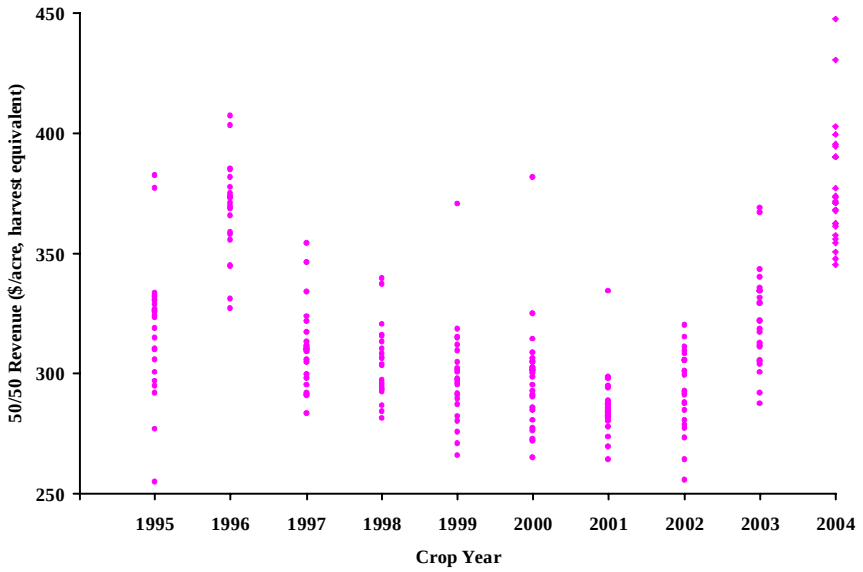


Figure 16. Average Net Advisory Prices and Benchmark Prices for Corn, 1995-2004 Crop Years, Commercial Storage Costs

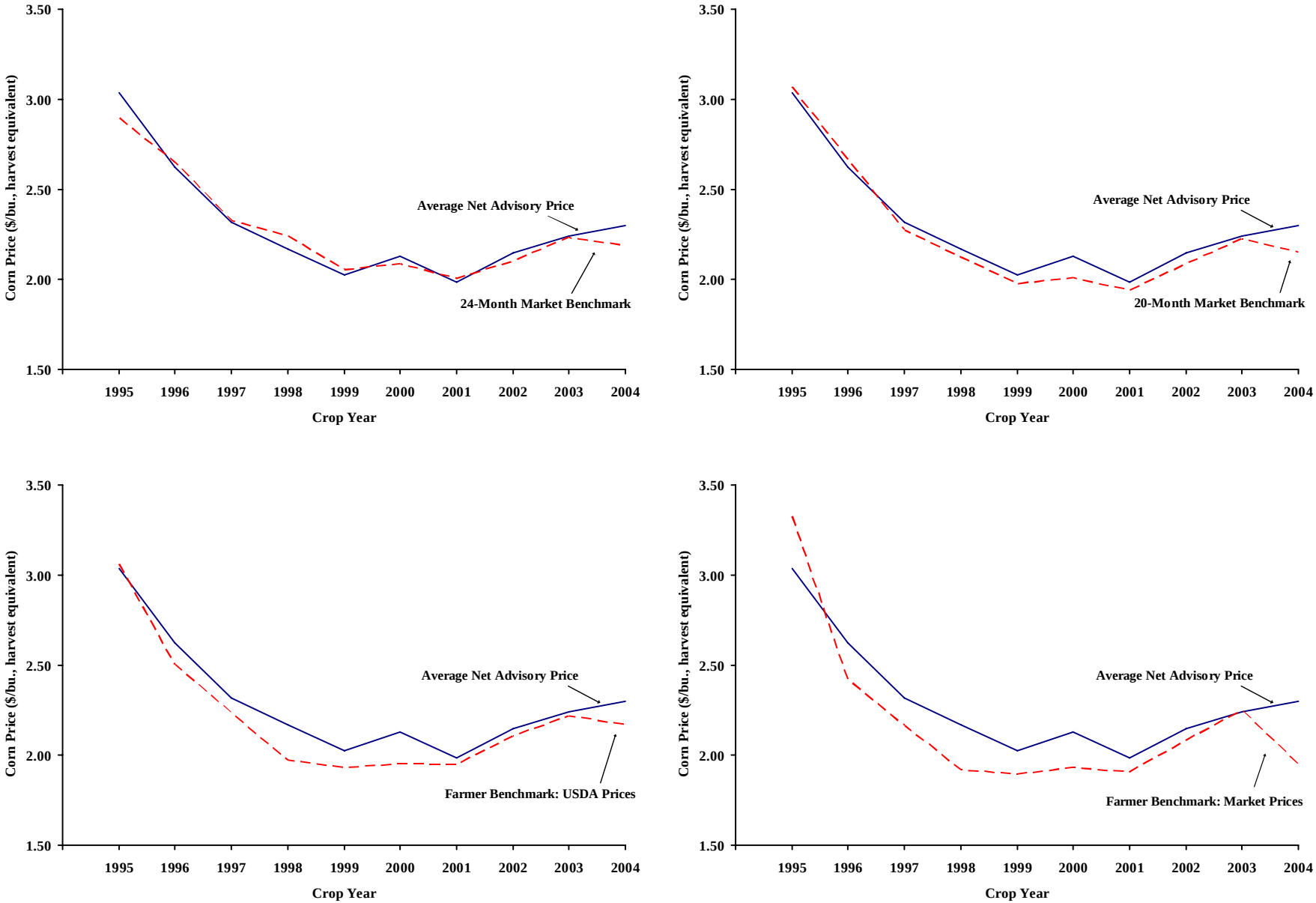
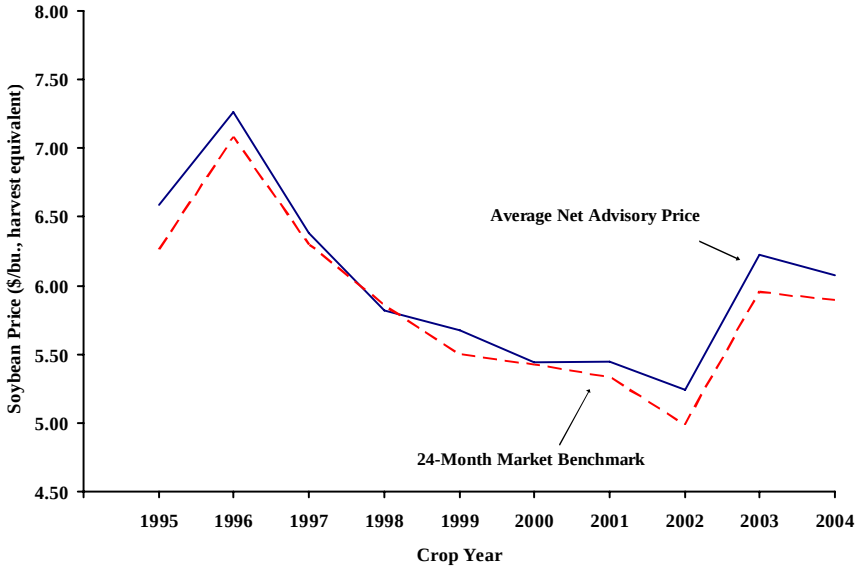
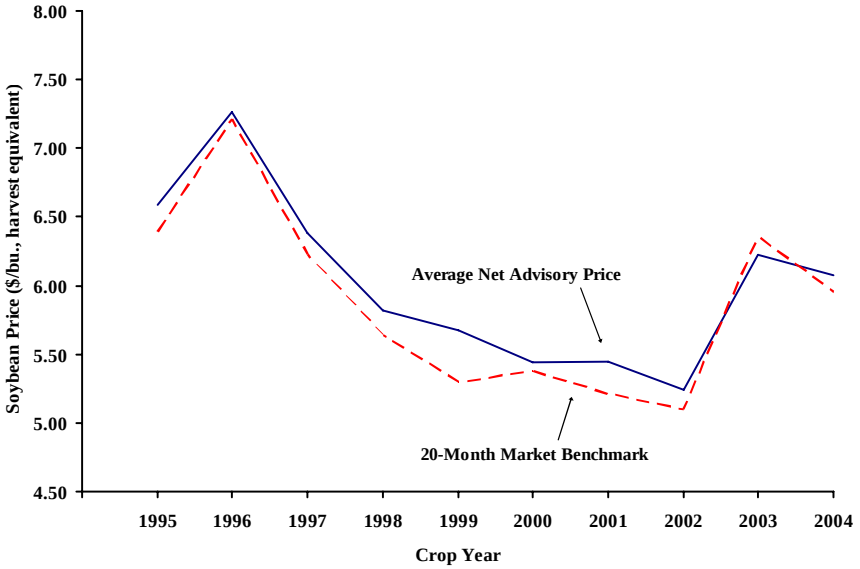
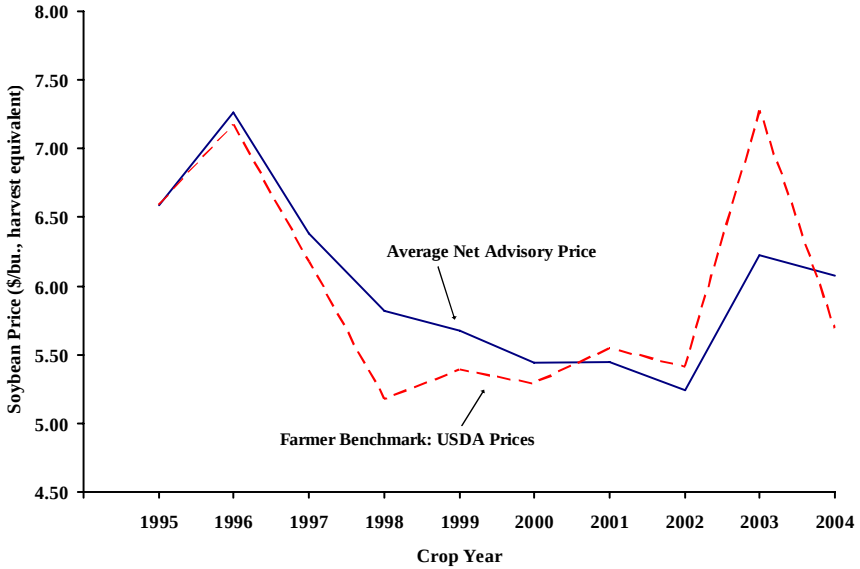


Figure 17. Average Net Advisory Prices and Benchmark Prices for Soybeans, 1995-2004 Crop Years, Commercial Storage Costs







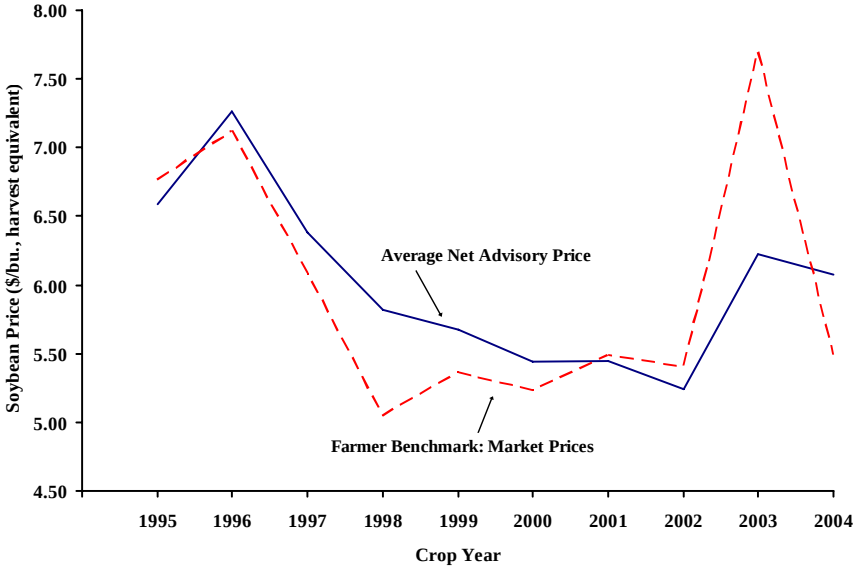


Figure 18. Average 50/50 Advisory Revenues and Benchmark Revenues, 1995-2004 Crop Years, Commercial Storage Costs

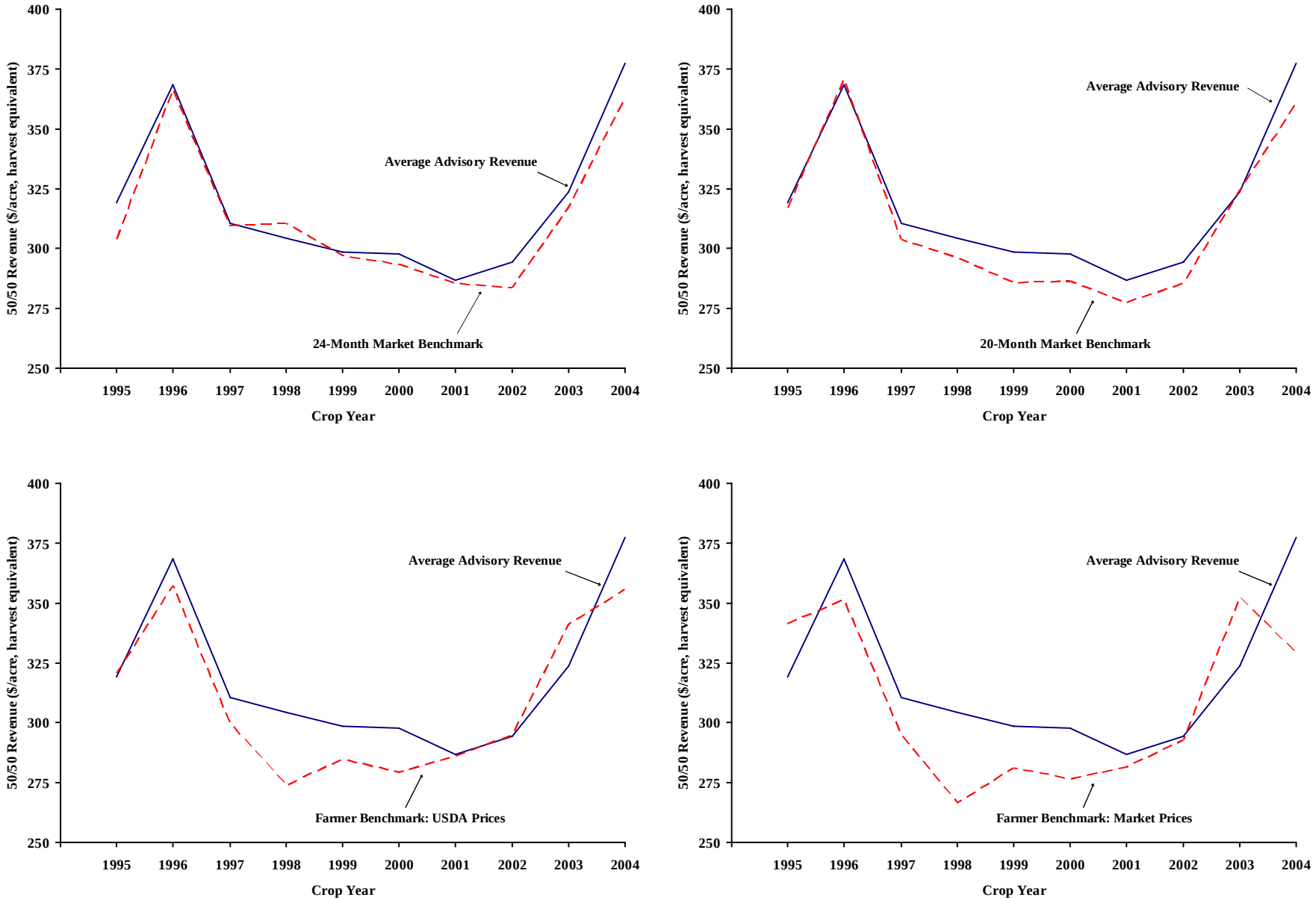


Figure 19. Conventional and Alternative Methods of Determining Top-, Middle-, and Bottom Third of the Price Range, Soybeans, 2003 Crop Year (No Marketing Loan Benefits Included)

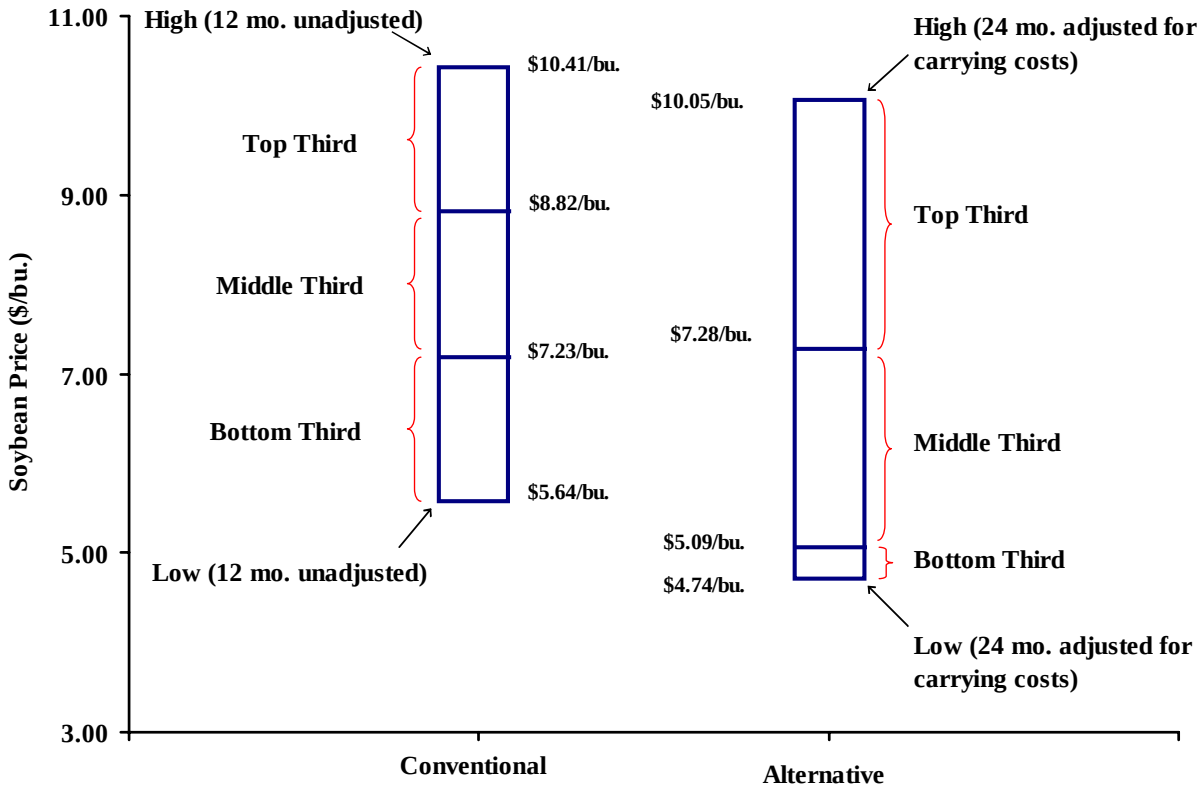
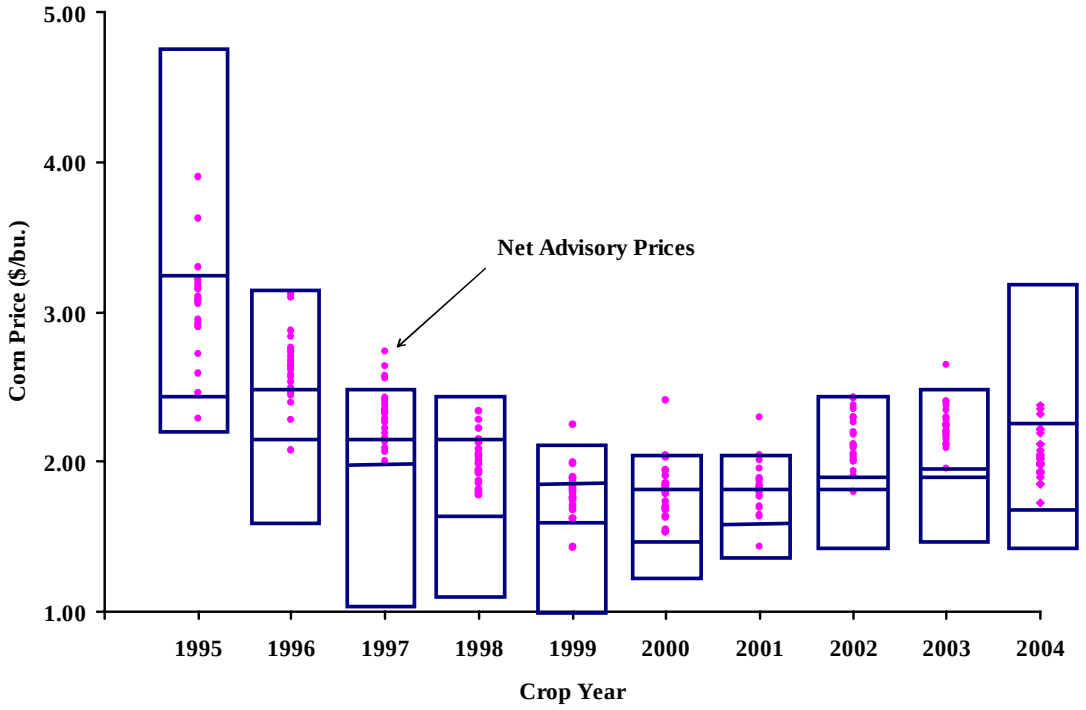


Figure 20. Net Advisory Prices and Top-, Middle-, and Bottom Third Price Ranges for 24-Month Marketing Window, Corn, and Soybeans, 1995 - 2004 Crop Years, Commercial Storage Costs (No Marketing Loan Benefits Included)

Panel A: Corn



Panel B: Soybeans

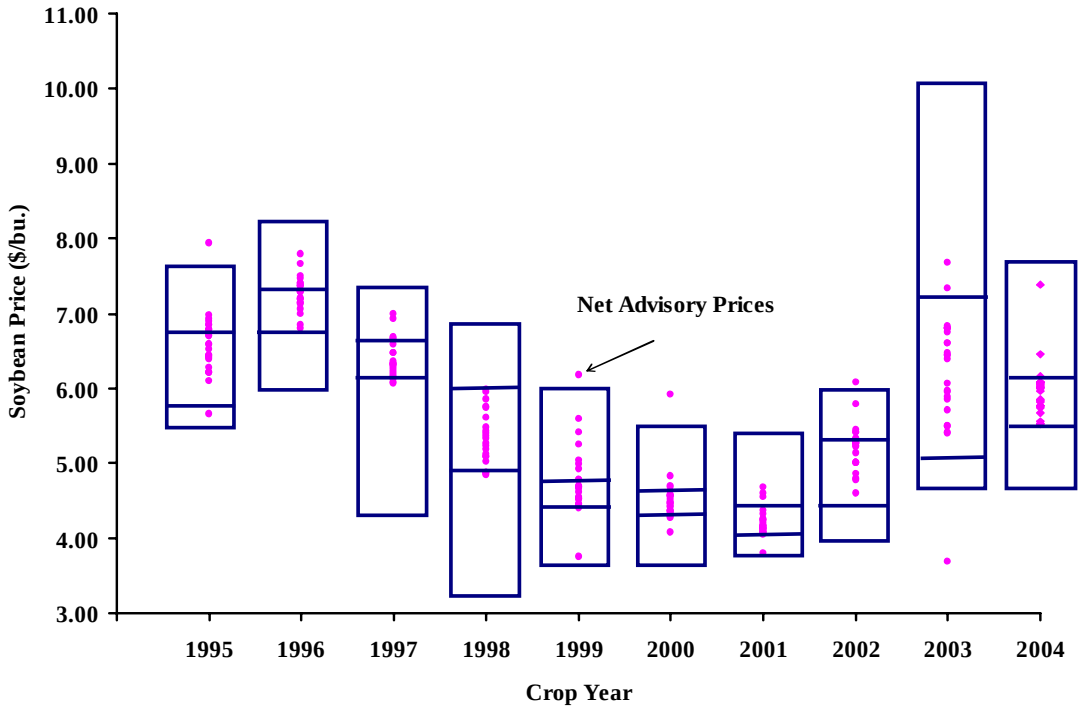
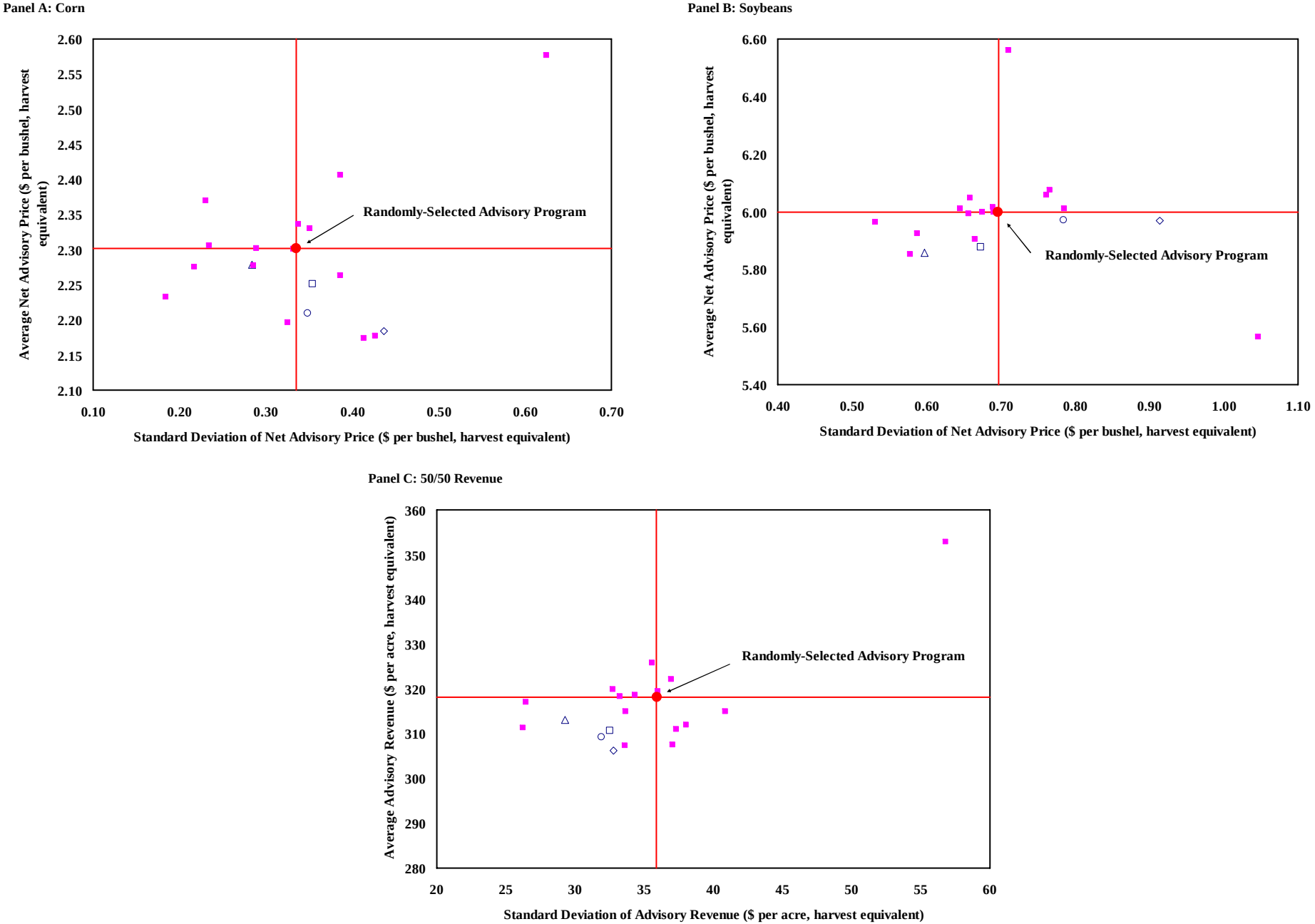


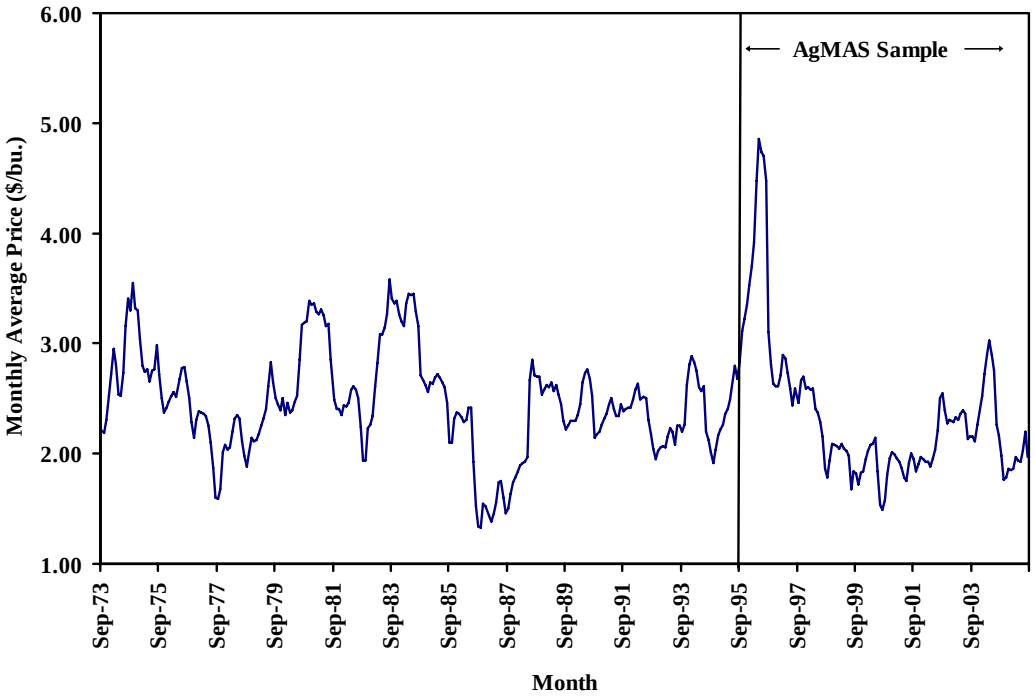
Figure 21. Average Price or Revenue and Standard Deviation for Advisory Programs and Benchmarks, 1995 - 2004 Crop Years, Commercial Storage Costs



Note: The following legend applies to each chart: solid squares = individual market advisory programs, solid circle = randomly-selected advisory program, open triangle = 24-month market benchmark, open square = 20-month market benchmark, open circle = farmer benchmark: USDA prices, and open diamond = farmer benchmark: market prices.

Figure 22. Average Monthly Spot Market Price of Corn and Soybeans, Central Illinois, September 1973 - August 2004

Panel A: Corn



Panel B: Soybeans

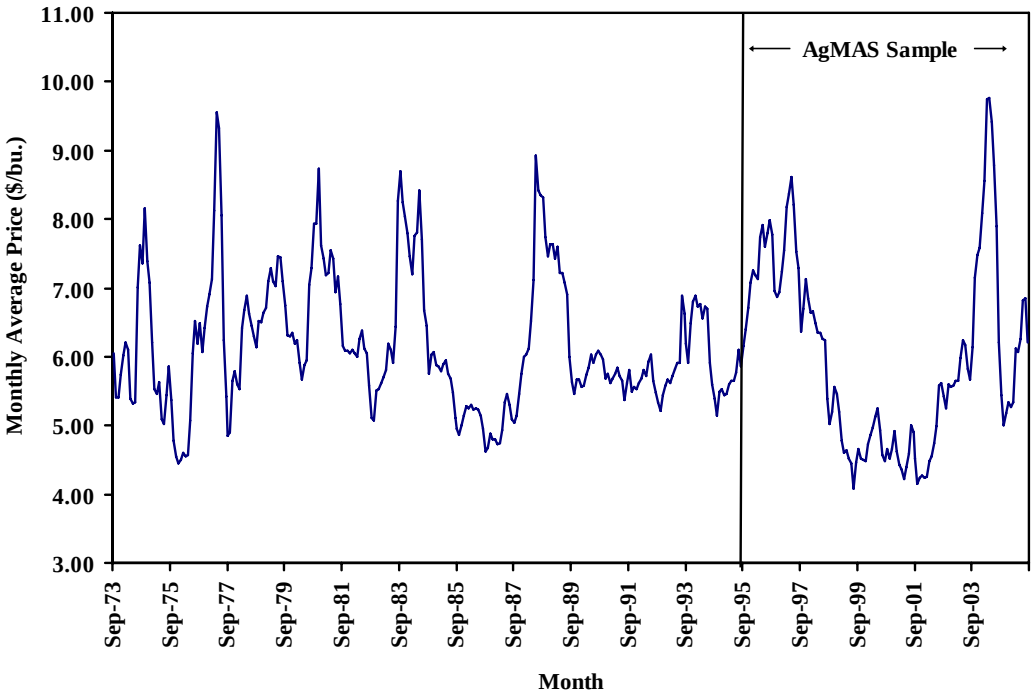
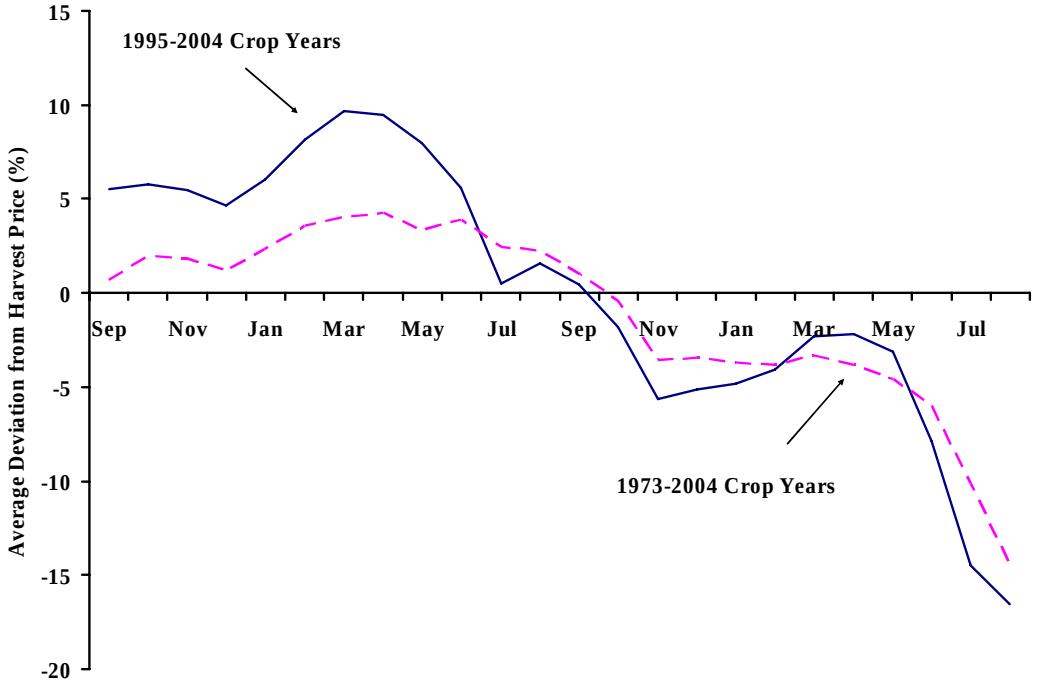


Figure 23. Average Monthly Prices of Corn and Soybeans, Central Illinois, 1995 - 2004 and 1973 - 2004 Crop Years, Commercial Storage Costs Subtracted Post-Harvest (No Marketing Loan Benefits Included)

Panel A: Corn



Panel B: Soybeans

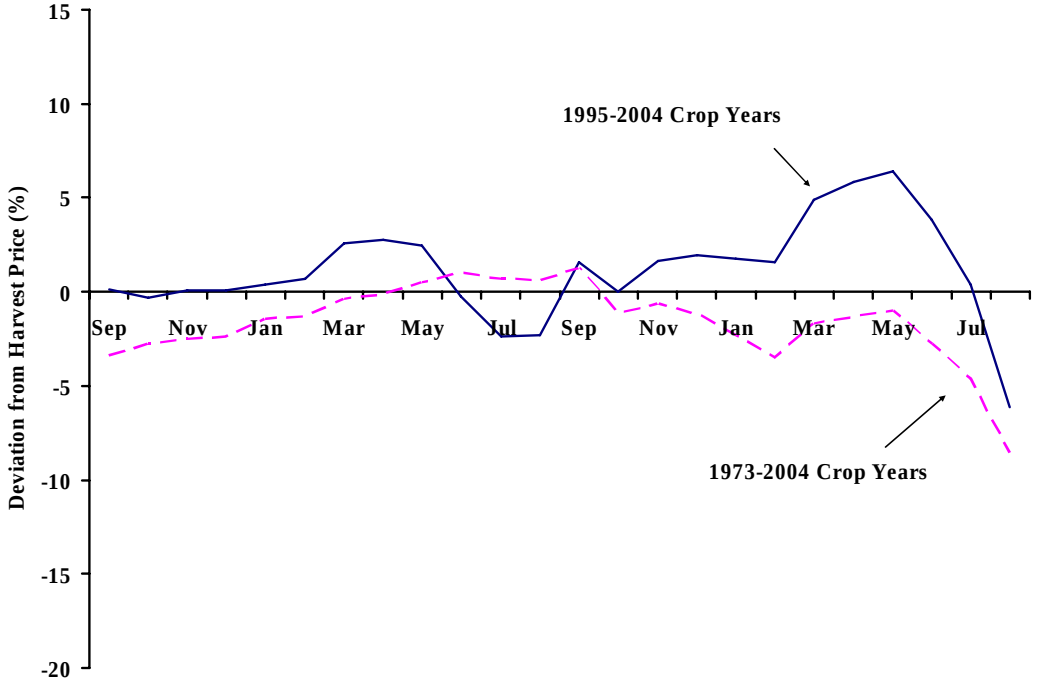
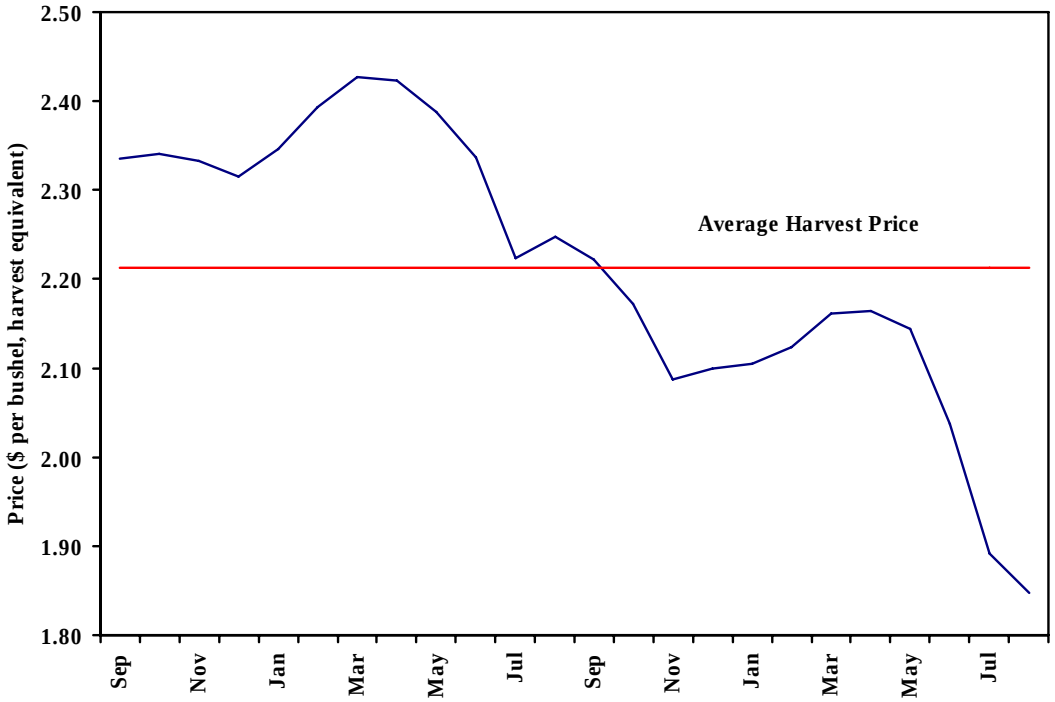
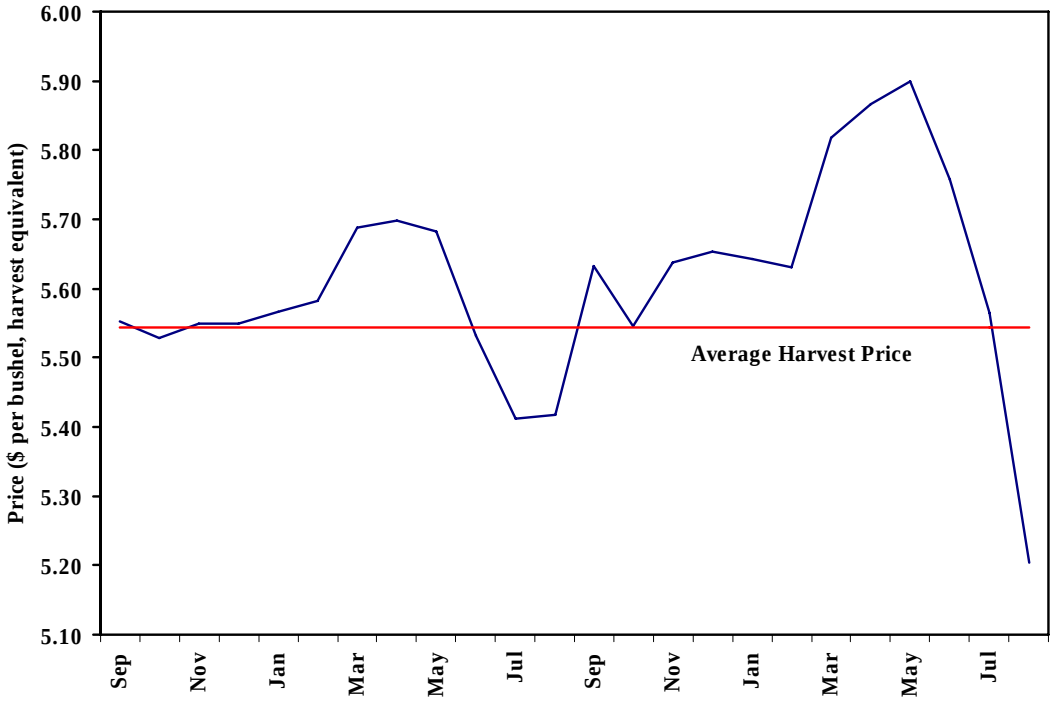


Figure 24. Average Monthly Prices of Corn and Soybeans, Central Illinois, 1995 - 2004 Crop Years, Commercial Storage Costs Subtracted Post-Harvest (No Marketing Loan Benefits Included)

Panel A: Corn



Panel B: Soybeans



Appendix A: Summary of Assumed Values for Key Variables Used in Simulation of Advisory Program Performance, 1995 - 2004 Crop Years

Table A1. Expected and Actual Central Illinois Corn and Soybeans Yields, 1995 - 2004 Crop Years

	Corn		Soybeans	
Crop Year	**Expected Yield**	**Actual Yield**	**Expected Yield**	**Actual Yield**
	---bushels per acre---		---bushels per acre---	
1995	140.0	119.0	46.0	43.0
1996	138.0	155.0	46.0	45.5
1997	141.9	140.0	46.5	46.5
1998	143.2	149.0	47.0	49.0
1999	145.6	158.0	47.8	49.0
2000	149.0	159.0	48.5	47.0
2001	152.4	157.0	48.8	48.0
2002	154.9	149.0	49.3	51.0
2003	156.1	183.0	50.0	38.0
2004	161.3	186.0	49.0	54.0

Table A2. Harvest Definition for Central Illinois, Corn and Soybeans, 1995 - 2004 Crop Years

	Corn		Soybeans	
Crop Year	**Harvest Mid-Point**	**Harvest Window**	**Harvest Mid-Point**	**Harvest Window**
1995	10/15	10/01 - 10/31	10/15	10/01 - 10/31
1996	10/15	10/01 - 10/31	10/15	10/01 - 10/31
1997	10/15	09/29 - 10/31	10/03	09/17 - 10/21
1998	10/12	09/24 - 10/28	10/05	09/17 - 10/21
1999	10/04	09/16 - 10/20	10/11	09/23 - 10/27
2000	09/26	09/08 - 10/12	10/06	09/20 - 10/24
2001	10/03	09/17 - 10/19	10/02	09/14 - 10/18
2002	10/07	09/19 - 10/23	10/08	09/20 - 10/24
2003	10/06	09/18 - 10/22	10/03	09/17 - 10/21
2004	09/30	9/14 - 10/18	10/01	9/15 - 10/19

Table A3. Interest Rates, 1995 - 2004 Crop Years

Crop Year	Interest Rate
	---% per year---
1995	8.60
1996	9.13
1997	9.20
1998	8.60
1999	9.20
2000	10.00
2001	7.40
2002	6.70
2003	6.30
2004	6.80

Table A4. Harvest Price and CCC Loan Rate for Central Illinois, Corn and Soybeans, 1995 - 2004 Crop Years

	Corn		Soybeans	
Crop Year	Harvest Price	CCC Loan Rate	Harvest Price	CCC Loan Rate
	---$ per bushel---		---$ per bushel---	
1995	3.22	1.95	6.40	5.08
1996	2.81	1.95	6.95	5.13
1997	2.65	1.95	6.57	5.42
1998	1.91	1.95	5.14	5.42
1999	1.74	1.95	4.54	5.42
2000	1.64	1.95	4.56	5.41
2001	1.87	1.95	4.33	5.41
2002	2.43	2.06	5.28	5.16
2003	2.04	2.04	6.66	5.14
2004	1.82	2.01	5.02	5.14

Appendix B: A Cautionary Note on the Use of AgMAS Net Advisory Prices and Benchmarks

The net advisory prices and benchmarks computed by the AgMAS Project are designed to reflect "real-world" marketing conditions and assure that net advisory service prices and benchmarks are computed on a rigorously comparable basis. This latter point is especially important, as performance evaluations must compare "apples to apples" and not "apples to oranges." Comparison problems may arise if prices computed by an individual farmer, or another market advisory service, are compared to AgMAS net advisory prices and benchmarks.

First, and foremost, AgMAS net advisory prices and benchmarks are stated on a harvest equivalent basis. This means that spot cash prices for post-harvest sales are adjusted for storage costs, which include physical storage charges, shrinkage charges and interest opportunity costs. The impact of this assumption is illustrated in the top panel of Figure A1 for corn and the bottom panel for soybeans. The top line in each chart shows the 2004 harvest cash price for each crop (corn: $1.82 per bushel; soybeans: $5.02 per bushel). The bottom line reflects a cash sale at the same harvest price one to eleven months after harvest, with the cash price adjusted for commercial costs of storage. As a specific example, consider a six-month storage horizon for corn. In this case, the cash price of the sale six-months after harvest is assumed to be $1.82 per bushel, the same as the harvest cash price (equivalent to saying cash prices do not change over the six-month storage period). However, the harvest equivalent price for the sale six months after harvest is only $1.59 per bushel after adjusting for commercial storage costs. Thus, the difference between unadjusted and adjusted post-harvest prices in this example is 23¢ per bushel, a substantial difference by any standard. The magnitude of the difference is larger for longer storage horizons and for soybeans relative to corn. Note also that the difference will not be as large if on-farm variable costs of storage are assumed instead of commercial costs.

This discussion should make clear the potential pitfalls in comparing the unadjusted average cash price for an individual farmer or another market advisory service to the harvest equivalent advisory prices and benchmarks computed by the AgMAS Project. If such a comparison is made, it is not difficult to imagine a scenario where it is mistakenly concluded that the performance of the farmer or market advisory service is superior to the advisory services, market benchmarks and farmer benchmarks included in the AgMAS Project.

Second, AgMAS evaluations assume a particular geographic location. Specifically, the evaluation is designed to reflect conditions facing a representative central Illinois corn and soybean farmer. This means comparisons made by farmers or advisory services in other areas of the US may not be valid, because yields and basis patterns may be quite different. The differences in yields and basis patterns could have a substantial impact on prices computed for farmers or advisory services in another area. The resulting bias could be either up or down relative to AgMAS advisory prices and benchmarks, depending on local conditions.

Third, wherever feasible, marketing loan recommendations from advisory programs are followed by the AgMAS Project. Consequently, marketing loan payments or benefits are incorporated into net advisory prices. Market and farmer benchmark prices also include marketing loan payments or benefits. Hence, it would not be appropriate to compare prices for

individual farmers or another market advisory service if marketing loan payments or benefits are not included in the prices or included in some other way.

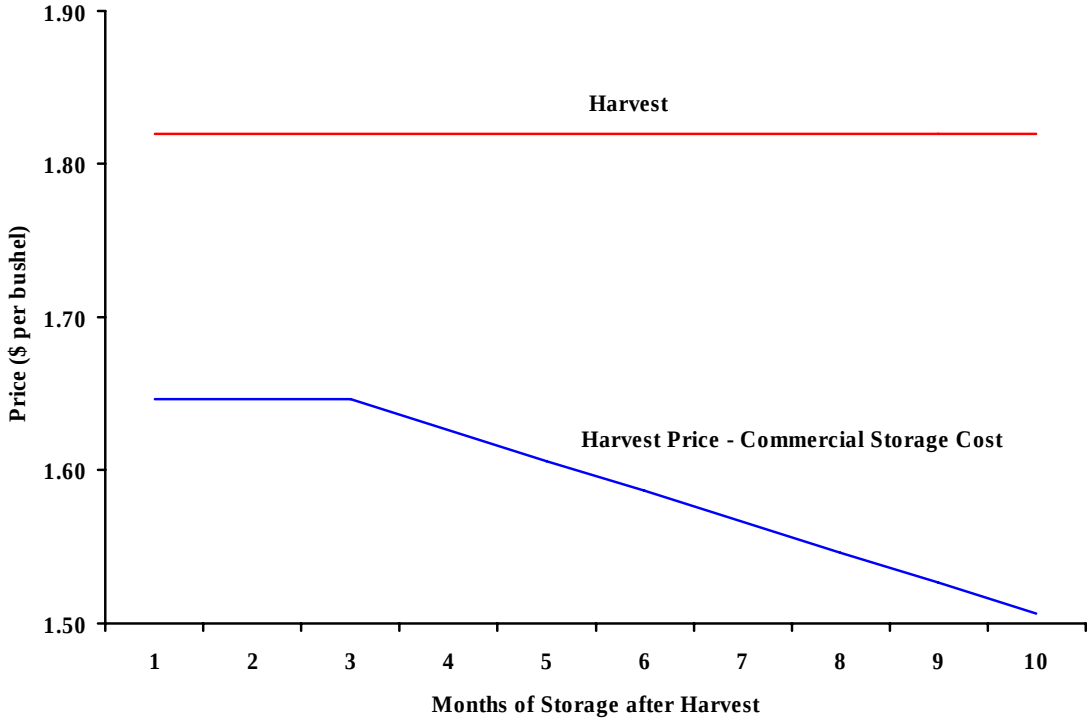
Fourth, the marketing recommendations attributed to each advisory program represent the best efforts of the AgMAS Project staff to accurately and fairly interpret the information made available by each program. In cases where a recommendation is vague or unclear, some judgment is exercised as to whether or not to include that particular recommendation or how to implement the recommendation. Given that some recommendations are subject to interpretation, the 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.

Fifth, net advisory prices may differ substantially from those computed by an advisory program or another subscriber due to differences in fill (execution) prices for futures and options positions. All reported fill prices are cross-checked against the price range of the relevant futures or options contract on the same date. If the fill price for any type of order is within the daily range, it is entered as the executed price for the recommended transaction. If the fill price for a market order is outside the daily range, the settlement price for same day is recorded as the executed price. If the fill price for a limit-price, sell-stop or buy-stop order is outside the daily range, then the recommended transaction is not included in the track record. In addition, price targets for limit-price, sell-stop and buy-stop orders are cross-checked against the daily price range of the relevant futures or options contract on the reported fill date. If the price target and associated fill price (generally the same) are within the daily price range, then the reported fill price is used. If the price target is not in the daily range, then the recommended transaction is not included in the track record.

In sum, it is inappropriate to directly compare prices for individual farmers or another market advisory service to AgMAS net advisory prices or benchmarks unless the same assumptions are used. To make valid comparisons, AgMAS assumptions regarding, storage costs, yield, basis, marketing loans, track records and fill prices have to be applied.

Figure B1. Storage Cost Comparison for Corn and Soybeans, Central Illinois, 2004 Crop Year

Panel A: Corn



Panel B: Soybeans