The Marketing Style of Advisory Services for Corn and Soybeans in 1995

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Abstract

Management of price volatility is an important business activity for crop producers. There is considerable evidence that crop producers highly value advisory services as a source of marketing information and advice. Differences in advisory service approaches to marketing should influence a farmer's choice of a service. However, information on the marketing "style" of different advisory services is exceedingly difficult for producers to obtain on their own, and virtually no previous research on this topic is available.

Marketing styles for the 25 market advisory service programs included in the AgMAS Project were developed in two steps. The first step was the construction of a detailed "menu" of the tools and strategies used by each of the advisory programs. The menu describes the type of pricing tool, frequency of transactions, and magnitude of transactions. The second step was the development of a daily index of the net amount sold by each market advisory program. To construct such an index, the various futures, options, and cash positions recommended for a program on a given day were weighted by the respective position "delta." When the daily values of the index were plotted for the entire marketing period, the marketing "profile" for a program was generated.

The results of the 1995 marketing style analysis for corn and soybeans suggest the following conclusions,

- Advisory programs made a relatively small number of recommendations.
- Recommendations of the market advisory programs primarily involved cash marketing strategies, not futures and options.
- A short futures position was the non-cash marketing strategy most recommended by this group of advisory programs.
- Cash "re-ownership" strategies, whereby long positions in options and/or futures were taken after a previous cash sale of the commodity, were a relatively popular strategy.
- Option contracts tended to be used in combination with other options or futures.
- Non-cash marketing recommendations were typically held open for a short period of time.
- Despite the attention directed to hedge-to-arrive contracts during the 1995 marketing season, the programs were not heavy users of this tool.
- The pre-harvest amount sold averaged 35 percent for corn and 30 percent for soybeans (end of August for corn and soybeans), an amount much smaller than the typically generated by optimal hedging models.

The Marketing Style of Advisory Services for Corn and Soybeans in 1995

Management of price volatility is an important business activity for crop producers. Using a survey of large-scale, midwestern grain producers, Patrick and Ullerich (1996) report that price variability is the highest rated source of risk by crop producers. The changes in U.S. agricultural policy beginning in 1996 and fluctuations in global economic conditions beginning in 1997 suggest that price variability will continue to be a major source of risk for producers.

Producers have a number of price risk management tools at their disposal. These include public and private sources of market information, futures and options contracts and revenue insurance tools. In addition, new trade option alternatives are on the horizon. There is considerable evidence that crop producers highly value advisory services as a source of marketing information and advice. In a rating of 17 risk management information sources, Patrick and Ullerich (1996) find that computerized information services and market advisors are ranked second. Patrick, Musser, and Eckman (1998) indicate that 35 and 38 percent of large-scale, midwestern grain producers used marketing consultants in 1993 and 1994, respectively.

In September 1994, the Agricultural Market Advisory Service (AgMAS) project was initiated, with the goal of providing unbiased and rigorous evaluation of market advisory services for crop producers. Since its inception, the AgMAS project has collected real-time marketing recommendations for about 25 market advisory programs. Jackson, Irwin, and Good (1998) report pricing performance results for corn and soybeans for the 1995-96 and 1996-97 marketing years.

The annual AgMAS comparison of net price received among advisory services by commodity is an important criterion for producers in selecting an advisory service. However, pricing performance is not likely to be the only relevant criterion used by producers in making such decisions. For example, two advisory services may generate similar net price results in a given marketing year, but the paths to that result might differ significantly along several dimensions, including: 1) type of recommended pricing tool (cash, futures, options, etc.), 2) timing of sales, and 3) frequency of transactions.

Specific examples will help illustrate the range of approaches that advisory services may employ. One service may make use of "selective" hedging strategies, while another may use only "conventional" hedging strategies and cash sales. Some services may recommend selling (writing) options, while others only recommend buying options. Storage may or may not be recommended. Additionally, a particular service may use a strategy involving only a few pricing decisions, but in large quantities, while a competitor uses numerous pricing decisions in smaller quantities.

It is well known that farmers differ in their approach to marketing (e.g., Goodwin and Schroeder, 1994; Goodwin and Kastens, 1996; Patrick, Musser, and Eckman, 1998). As a result, differences in the marketing approach of advisory services should influence a farmer's choice of services. However, information on the marketing "style" of different advisory services is

exceedingly difficult for producers to obtain on their own, and virtually no previous research on this topic is available.[2]

Marketing styles for the 25 market advisory service programs included in the AgMAS Project will be developed in two steps. The first step is the construction of a detailed "menu" of the tools and strategies used by each of the advisory services. The menu will describe the type of pricing tool, frequency of transactions, and magnitude of transactions. The second step is the development of a daily index of the net amount sold by each market advisory service. To construct such an index, the various futures, options, and cash positions recommended for a service on a given day must be weighted in some manner. Fortunately, the price exposure of a portfolio of positions is a weighted-average of the price exposures of the individual positions, where the weights are the "deltas" of the individual positions (Hull, 1997). A daily delta-weighted index will be computed for each advisory service and commodity during a marketing year. When the daily values of the index are plotted for the entire marketing period, the marketing "profile" for a service will be generated.

Data Collection

The source for the market advisory services included in the study is the Data Transmission Network (DTN), via their Ag Daily, DTNstant, and/or DTN FarmDayta services. Given the focus of this study, only those services judged to contain specific marketing advice for agricultural producers are included.

The AgMAS Project purchases a subscription to each of the services, and the information is received via DTN. Staff members of the AgMAS Project read the information provided by each advisory service on a daily basis. For the services that provide two daily updates, typically in the morning and at noon, information is read in the morning and afternoon. In this way, the actions of a farmer-subscriber are simulated in "real-time."

Some advisory services offer two or more distinct programs. (Agri-Edge, Brock Associates, Pro Farmer, and Stewart-Peterson Advisory Services each have two distinct marketing programs, and Agri-Visor has four 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 producers who only wish to make cash sales.[3] In this situation, both strategies are recorded and treated as distinct strategies to be evaluated.[4] The total number of "advisory programs" evaluated is twenty-five. A

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[2] Considerable effort in recent years has been devoted to categorizing and estimating mutual fund styles (e.g. Sharpe, 1992; Brown and Goetzmann, 1997).

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

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

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

When a recommendation is made regarding the marketing of corn or soybeans, the recommendation is recorded. In recording recommendations, specific attention is paid to which year's crop is being sold, (e.g., 1995 crop), the amount of the commodity to be sold, which futures or options contract is to be used (where applicable), and any price targets that are mentioned (e.g., sell cash corn when March 1996 futures reach $3.00). When price targets are given and not immediately filled, such as a stop order in the futures market, the recommendation is noted until either the order is filled or is canceled.

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

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

A two-year marketing window, spanning September 1, 1994 through August 31, 1996, is used. The beginning date is selected because the first recommendation made by an advisory services for the 1995 crop occurred during September 1994. The ending date is selected to be consistent with the ending date for corn and soybean marketing years as defined by the US Department of Agriculture (USDA). There are a few exceptions to the marketing window definition. Three advisory programs had relatively small amounts (25% or less) of cash corn or soybeans unsold as of August 31, 1996. Any part of the crop not sold by the end of the 1995 marketing window, is considered to have been sold in the cash market on August 31, 1996.[5]

Tools and Strategies

This section describes the tools and strategies used by advisory programs regarding the marketing of corn and soybeans over the marketing window for the 1995 crop (September 1,

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[5] This assumption differs from that used in AgMAS pricing evaluations (e.g. Jackson, Good and Irwin, 1998). In the pricing evaluations, net prices for transactions occurring after the "official" end of the marketing window are recorded at the prices available on the transaction date. A single cutoff date is used in the style analysis to ensure a uniform period of comparison across all advisory programs.

1994 through August 31, 1996). The description focuses on the type of pricing tool, frequency of transactions, and magnitude of transactions.

Marketing Tools

As shown in Tables 1 and 2, the following marketing tools were recommended by at least one advisory program for both corn and soybeans: cash spot sales, cash forward contracts, hedge-to-arrive contracts, short futures, long futures, short call options, long call options, long put options, and short put options. There were a total of 305 corn recommendations, or an average of 12.2 corn recommendations for each advisory program. Stewart Peterson made the most corn recommendations (23) and Harris Weather made the least (4). For soybeans, 292 recommendations were made by all 25 advisors, which averages out to 11.7 per advisory program. Stewart Peterson (31 recommendations) and Harris Weather (2 recommendations) again defined the range of maximum and minimum recommendations.

Fifty-six percent of all corn recommendations and fifty-eight percent of soybean recommendations involved cash sales only (cash spot and cash forward recommendations). The importance of cash marketing strategies was not surprising, as farmers are long corn and soybean production, and thus, at some point during the marketing window must sell 100 percent of the crop harvested via cash tools. Cash forward recommendations were more numerous than cash spot sales. For corn, 104 cash forward recommendations were issued and 68 cash spot recommendations were issued. For soybeans, there was a total of 89 cash forward recommendations and 82 cash spot recommendations.

Most programs used a combination of cash spot sales and cash forward contracts. For corn the only programs that did not use cash spot sales were Brock Cash Only and Brock Hedging Strategy, which were 100 percent sold through cash forward contracts before harvest. Agrimark, Agri Visor Aggressive Hedge, Agri Visor Basic Cash, Agri Visor Aggressive Cash, Allendale, Harris Weather and Prosperous Farmer were the seven programs that did not recommend cash forward contracts for corn. In the case of soybeans, Brock Hedging Strategy and Harris Weather were the only two programs that did not recommend cash spot sales. Four programs did not recommend soybean cash forward contracts: Agrimark, Allendale, Pro Farmer Hedging Strategy and Prosperous Farmer.

Among non-cash tools, short futures was the most common recommendation for both corn and soybeans. A total of 62 corn and 49 soybean short futures recommendations was made by 15 and 14 marketing programs, respectively. Short futures was the only tool besides cash spot and cash forward that averaged more than one recommendation per advisory program. The maximum number of times an individual program recommended short futures for corn was 11 (Brock Hedging Strategy). The maximum number of times short futures were recommended for soybeans was nine (Stewart Peterson). It should be noted that six advisory programs are restricted by their code of operations to cash spot sales and forward contract strategies. These programs can be identified through the use of cash only or strictly cash in their name.

Among non-cash tools that represent an intention to sell the underlying commodity (short futures, short call, long put, and hedge-to-arrive), the second most recommended non-cash tool for corn was hedge-to-arrive (15 recommendations). For soybeans, short calls and long puts each had nine recommendations. Thus, a substantial gap existed between the use of short futures and other short non-cash marketing tools.

Forty recommendations for corn and forty-eight recommendations for soybeans involved marketing tools that represent an intention to buy the underlying commodity (long futures, long call and short put). Of these three tools, long futures was the most commonly recommended for corn (17 recommendations) while long calls was the most commonly recommended for soybeans (21 recommendations). Long strategies tended to be recommended multiple times by those advisory programs that made them. For example, the 17 long futures positions in corn were recommended by seven advisory programs, while the 21 long call positions in soybeans were recommended by nine advisory programs.

Non-Cash Marketing Strategies

This section describes the non-cash strategies used by marketing advisory programs for the 1995 corn and soybeans crops. Tables 3 and 4 present descriptive statistics for corn and soybean short non-cash strategies, respectively. Tables 5 and 6 present descriptive statistics for corn and soybean long non-cash recommendations, respectively. The data presented in these tables are as of the last trading day of the month; only data for these dates were presented in order to conserve space and to present data in a concise manner.

Short Strategies

As reported in Table 3, corn short futures recommendations existed from September 1994 through December 1995. However, recommendations were most prominent during planting and post-planting/pre-harvest periods. Averaged across all marketing programs, at least 10 percent of the expected corn crop was sold using short futures over the period from April 1995 through September 1995. The largest amount occurred at the end of May 1995, involving 20.5 percent of the expected crop. The maximum amount recommended sold by an individual program using short futures was 100 percent (Agri Visor Aggressive Hedge, Allendale and Prosperous Farmer).

The pattern of recommendations involving short futures for soybeans, shown in Table 4, was similar to that for corn . Soybean short futures recommendations existed from November 1994 through December 1995, but were most frequent during planting and post-planting/pre-harvest periods. Recommendations were most common at the end of April, May, June and August 1995 (each month had seven recommendations). The largest average amount of expected production sold using short futures occurred at the end of June 1995 (16.4 percent). Like corn, 100 percent of expected production was the largest recommended amount sold by an individual program via short futures (Prosperous Farmer and Top Farmer Intelligence at the end of June 1995).

The least recommended non-cash marketing strategy for corn was short calls. Three programs (Ag Review, Agrimark and Prosperous Farmer) made one corn short call recommendation each. Short call recommendations were open between May 1995 and November 1995. All three recommendations were issued during the planting period (May and June 1995). The maximum amount sold by a single program using corn short calls was 100 percent (Prosperous Farmer). The largest amount of corn sold by short calls, when averaged across all programs, was six percent during June 1995.

For soybeans, short calls recommendations existed from March 1995 through June 1996, except for July 1995 and August 1995. The maximum quantity mentioned in a short call recommendation was 40 percent (Brock Hedging Strategy). The month with the largest average amount recommended across all programs was June 1995 (2.5 percent).

A long put strategy for corn was recommended twelve times by ten advisory programs. Eight of these recommendations were open from May through November 1995 (planting through harvest period). During September and October 1995, seven programs had long put recommendations for corn. The average amount recommended by all programs at the end of these two months was 10.4 percent. The four other corn long put recommendations were made from February 1996 through June 1996 (post harvest period). The maximum long put recommendation was 50 percent (Brock Hedging Strategy, Harris Weather, North American Ag).

In the case of soybeans, nine long put recommendations were spread over the period from March 1995 through June 1996. The most number of soybeans long put recommendations occurred at the end of January 1996 (three) and February 1996 (four). No long puts were opened during April 1995, May 1995, November 1995 and April 1996. The maximum long put recommendation was 50 percent (Ag Review, Agri Visor Aggressive Cash, Hjort and North American Ag).

Hedge-to-arrive contracts (HTA) were recommended fifteen times for corn by seven marketing advisory programs. Four of these seven programs were operated by the same advisory service (Agri Visor), and accounted for 11 of the 15 HTA recommendations. Corn HTA recommendations existed from November 1994 through April 1996. Between March 1995 and February 1996, at least five programs had corn HTA recommendations open. The largest average recommendation across all programs occurred at the end of October 1995 (9.6 percent). The highest amount recommended for corn HTAs was 75 percent (Agri Visor Basic Cash and Agri Visor Aggressive Cash), while the average size of a recommendation was 31 percent.

Only three programs recommended HTAs for soybeans. Agri Edge's two marketing programs had HTA recommendations open from February 1995 through September 1995. Agri Visor Aggressive Cash placed all four of their HTA recommendations from November 1995 through March 1996. The size of an HTA recommendation ranged from 15 to 30 percent of actual or expected production. At no time during the 1995 marketing window did the amount recommended to be sold using soybean HTAs exceed two percent when averaged across all programs.

Long Strategies

The results presented in Tables 5 and 6 indicate that recommendations involving corn and soybean long futures positions followed similar patterns. For corn, recommendations existed continuously from May 1995 through May 1996. For soybeans, recommendations existed continuously from June 1995 through May 1996. For both corn and soybeans, the largest aggregate amount recommended by advisory programs occurred at the end of June 1995 (seven percent for corn and five percent for soybeans). The maximum recommendation by an individual program was 100 percent for both corn and soybeans (Prosperous Farmer for both).

Long call positions were recommended relatively frequently in corn, with eight advisory programs making a total of 16 recommendations. Long call recommendations existed from January 1995 through January 1996. However, two distinct periods emerge when the recommendations are examined in detail. The first period starts in January 1995 and lasts through October 1995. A total of 11 long call recommendations was made during the pre-harvest period. All of these long call recommendations were offset no later than the end of November 1995 (end of harvesting period). From March through October 1995, five to six programs had corn long call recommendations open. Advisory programs averaged between eight and thirteen percent of corn production marketed using the corn long call positions. The second distinct period for long call recommendations for corn begins in November 1995 when the other five long call recommendations were made. These recommendations were all closed by the end of January 1996.

Soybean long call recommendations were open from February 1995 through August 1996. As with corn, there were two periods of heaviest use, one was associated with the growing season while the second was associated with the post-harvest storage period. Between three and five programs had long call recommendations open from June through September 1995, while three to four programs had soybean long call recommendations open from January through April 1996. The long call recommendations ranged from 15 to 50 percent of actual production.

Four programs made corn short put recommendations and three programs made soybean short put recommendations. Short puts existed for corn (soybeans) from January 1995 (February 1995) through February 1996. For both crops, the largest amount recommended for short puts was 50 percent. The average amount recommended by all advisory programs for corn short puts never exceeded more than 3.6 percent of production.

Combinations of Non-Cash Strategies

The preceding discussion focuses on non-cash recommendations as individual marketing tools. However, as shown in Tables 7 and 8, they may be recommended in combination with each other. The marketing tool most recommended in combinations for corn was short futures (28 recommendations). For soybeans it was long calls (14 recommendations). Note that the combination of short futures and a forward contract are not included in Tables 7 and 8. The reason is that, since basis and production risks are being ignored in this study, these two marketing tools essentially result in equivalent positions relative to the underlying cash spot sale.

When compared to Tables 1 and 2, Tables 7 and 8 reveal that the great majority of options contracts were recommended in combination with another marketing tool. For corn and soybeans, all short call recommendations involved combinations. Seventy-five percent of the soybean long put recommendations and 67 percent of the corn long put recommendations were used in combination with other derivatives and/or forward contracts. Eighty-one percent of corn and sixty-seven percent of soybean long calls were used in combinations. Furthermore, 86 percent of all corn and soybean short put recommendations were used in combination with another marketing tool.

Table 7 shows that six long futures recommendations and one long call recommendation were taken against forward contracts for corn. Table 8 shows that, for soybeans, there were five long futures and four long calls taken against forward contracts. In total for corn, thirteen long futures and one long call position were opened after a forward contract or cash spot sale was made. For soybeans, eleven long futures and nine long call recommendations were made after a forward contract or cash spot sale was made. No short put recommendations were made after a cash sale for corn and soybeans.

Tables 9 and 10 show all combinations where more than one derivative tool was employed. The common name of this combination, if any exists, is also given (Natenburg, 1994). The number of combinations involving a derivative can exceed the number of times the derivative was recommended. This is because, during the period of time a derivative recommendation was opened, several other positions may have been opened and offset, resulting in several different combinations. For example, corn short calls were recommended only three times, but a total of 12 combinations involved corn short calls. Each type of combination involves a different risk-return tradeoff.

Across all advisory programs, there were a total of 31 derivative combinations recommended for corn and 26 for soybeans. As shown in Tables 9 and 10 there were five combinations of three or more non-cash tools for corn, and five for soybeans. Synthetic positions resulted from one half of the derivative combinations for corn and one third of the derivative combinations for soybeans. For corn, there were nine synthetic long puts, six synthetic short calls, one synthetic long futures, and one butterfly spread created through combinations of marketing tools. For soybeans, there were five fences, three synthetic long futures, three synthetic short puts, two synthetic long puts, two reverse butterfly spreads, one butterfly spread, and one synthetic short futures.

Length of Non-Cash Strategies

In general, as indicated in Tables 11 and 12, recommendations involving non-cash marketing strategies were held open for a relatively small share of the marketing window. For corn, the average length of recommendations for long futures, short futures, short calls, long puts, short puts and long calls were 21, 47, 56, 61, 71, and 83 workdays, respectively. The comparable averages for soybeans were 13, 26, 30, 33, 37, 44 and 87 workdays, respectively.

HTA recommendations were held open the longest averaging 154 workdays (seven months) for corn and 87 workdays for soybeans.

For corn, 61 percent of all non-cash recommendations (excluding hedge-to-arrive) were held open for less than three months, with 43 percent held open for less than four weeks (Table 13). For soybeans, 91 percent of all non-cash-marketing recommendations were held open for a period shorter than 3 months (Table 14). Twenty-one percent of all soybean non-cash recommendations were offset within one week of the recommendation being made.

Marketing Profiles

The data presented in the previous section shows that market advisory programs recommend farmers use a variety of tools and strategies. To construct a daily index of the net amount sold by each market advisory service, the various futures, options, and cash positions recommended on a given day must be weighted in some manner. Fortunately, the price exposure of a portfolio of positions is a weighted-average of the price exposures of the individual positions, where the weights are the "deltas" of the individual positions (Hull, 1997, p. 320). The definition of delta is the dollar amount that the value of a position changes for a one dollar increase in the price of the underlying commodity.[6] Hence, a long futures position has a delta of +1, as a one dollar per bushel increase in the price of the futures results in one dollar per bushel increase in the value of the position.

As the above discussion highlights, a position's delta usually is computed assuming that the underlying price change is positive. However, for this study of marketing profiles, a different perspective is taken, specifically, the perspective of downside price risk. For example, a short futures position is typically regarded as having a delta of -1. However, ignoring basis and yield risk, a short futures position *eliminates* downside price risk for a farmer. In other words, each bushel of the crop sold with a short futures position eliminates one bushel of downside price risk. This suggests it is appropriate to reverse the usual sign on delta, so that a short futures position will have a "delta" of +1. Likewise, ignoring basis and yield risks, cash spot sales and cash forward contracts also will have deltas of +1. From the perspective of a grain farmer marketing corn and soybeans, this interpretation seems more appropriate.

Options positions represent a more complicated situation with respect to deltas. Based on a farmer's perspective, options that represent a future intention to sell the underlying commodity (long put and short call) have positive delta values, while options that represent future acquisition of the underlying commodity (short put and long call) have negative delta values. The exact delta value depends on the relationship between the option's strike price, the underlying futures price, the time-to-expiration, and whether the option is a short or long position. For example, assume that the current futures price for corn is $2.50/bushel and that a long put is purchased with a strike price of $2.40/bushel and a premium of $0.10/bushel. If the futures price goes down by $0.50/bushel, the option's premium will increase by less than

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

$0.50/bushel to reflect the uncertainty about whether the option will remain in-the-money through expiration. Finally, in contrast to cash spot sales, forward contracts and futures contracts, the delta for an option position changes daily as the underlying futures price and time-to-expiration changes.

In this study, option deltas are calculated each day an option position is recommended by a market advisory program. The FINCAD financial software package is used for the calculations. It computes deltas based on Black's model (Black, 1976) and the implied volatility for the relevant option. Details of the computations can be found in the Technical Appendix to this report.[7]

Table 17 provides a summary of the delta values assumed in this study. It is important to emphasize that these deltas assume no yield or basis risk. Given the delta value for each recommended marketing position, the net amount sold across all recommended positions can be calculated as follows (Hull, 1997, p.320),

$$(1) \quad \Delta_t = \sum_{i=1}^{n} w_{it} \Delta_{it}$$

where Δ_t is the net amount sold aggregated across the n marketing positions open on date t and expressed as a percentage of actual production, w_{it} is the percentage sold using position i as of date t and Δ_{it} is the delta for position i as of date t. It is useful think of the net amount sold as the net hedge ratio recommended by an advisory service on date t.

The following example is used to illustrate the calculation of the net amount sold. First, assume a marketing program recommends a short futures position equal to 20 percent of expected production. Assuming no recommendations existed prior to this recommendation, the net amount sold now equals 20 percent (+1 x 0.20 x 100). Assume the next recommendation is a long call position equal to 35 percent of expected production and that this call has a delta of -0.42. The negative sign indicates that a long call involves buying, not selling, the commodity. The 0.42 indicates the price of the option will change 42 cents for each dollar change in the underlying futures price. The net amount sold is now 5.3 percent [20 + (0.35 x -0.42 x 100)]. If the long call moves out-of-the-money, its delta will approach zero and the net amount sold will increase towards 20 percent. This occurs because it becomes les and less likely that the long call will have a positive value at expiration, i.e. price will end up above the option's strike price. If instead the long call position moves into the money (i.e., the call's delta approaches -1), the net amount sold decreases. If the long call becomes deeply in-the- money, its delta approaches –1 and the net amount sold approaches -15 percent [20 + (0.35 x -1 x 100). In this last scenario, the long call position is equivalent to a long futures position in the underlying futures.

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[7] An additional issue is the delta for cross-hedged positions where corn (soybeans) is hedged with soybean (corn) futures positions. These deltas are estimated using regressions of corn and soybean futures prices. Details of the procedure also can be found in the Technical Appendix.

The daily values of the net amount sold of each advisor for corn and soybeans are presented in Figures 1 through 50. The scale for the percent sold generally runs from –40% to +120% for corn and –50% to +130% for soybeans. A negative percent sold represents a net long "hedging" position, +100% net sold means that the entire crop has been sold in some form, and above +100% represents "over-hedging." The path of the daily values can be thought of as the marketing "profile" for a given service and commodity. While the beginning and ending points of this path are the same for each service and commodity, the variation in between is striking. Some profiles resemble a classical scale-up sales strategy (e.g., Figure 4), others reflect substantial selective hedging (e.g., Figure 13), while a few include lengthy periods of long speculation (e.g., Figure 2), and some appear to be hard to classify.

To provide some perspective on the "average" advisory service marketing profile, end-of-month summary statistics on the net amount sold are presented in Tables 15 and 16. In addition to the net amount sold across all positions, information is also shown for three categories: 1) non-cash recommendations, 2) cash forward positions, and 3) cash spot sales. The breakout into the three categories provides useful detail on the evolution of the different types of positions that make up the marketing profile. The following discussion tracks the progress of the 1995 crop.

By the end of March 1995, the beginning of the planting period, 15 programs had made corn marketing recommendations. Averaged across all advisory programs 11.4 percent of expected corn production was sold. Eight percent was sold via non-cash strategies, while the remaining three percent represented cash forward recommendations. As mentioned in the previous section, corn pre-planting recommendations were dominated by short futures. For the individual programs, net amount sold at the end of the planting season ranged from -34 percent (Ag Resource) to 59 percent (Brock Hedging Strategy).

In the case of soybeans, the planting season started during May 1995. By the end of April 1995, the programs had recommended that an average of 16 percent of the soybean crop be sold. Nine percent of expected production was sold in the form of cash forward contracts and seven percent was sold using non-cash strategies. Seventeen of the twenty-five advisory programs placed recommendations in cash and/or non-cash marketing tools. As with corn, the first cash forward recommendation was made in February. For soybeans, by the end of the planting season, the range in the net amount sold was -19 percent (Agrimark) to 73 percent (Brock Hedging strategy).

During the planting season for corn (April through June 1995) average recommended sales via cash forward contracts increased from three percent (end of March 1995) to seventeen percent (end of June 1995). In contrast, the net non-cash amount sold changed only slightly: from eight percent at the end of March 1995 to ten percent at the end of June 1995. By the end of June, 22 programs had placed marketing recommendations. Among individual programs, Allendale had the maximum net amount sold (90 percent), while Agri Visor Aggressive Hedge had the minimum net recommendation (-15 percent).

Soybean recommendations exhibited a similar pattern during the planting months (May and June). The average amount recommended sold via cash forward contracts rose from 9.2 percent at the end of April 1995 to 16.6 percent at the end of June 1995. In contrast, the net non-cash amount sold increased by only two percentage points: from 6.6 percent in April 1995 to 8.5 percent at the end of June 1995. In total, 22 programs had made marketing recommendations by the end of the planting period. Among individual programs, Prosperous Farmer recommended selling 100 percent of production using non-cash recommendations (maximum amount recommended). Agri Visor Aggressive Hedge recommended the minimum net amount sold (–46 percent).

By the end of August 1995 (just before harvest), all 25 advisory programs had engaged in marketing corn. The average net amount sold by the 25 programs was 34.6 percent, with 24.4 percent sold via cash forward contracts and 10.2 percent sold via non-cash tools. The average net amount of soybeans sold by the end of August 1995 was 28.8 percent, with 23.8 percent via cash sales, and five percent via non-cash positions.

During the harvest period, the use of non-cash recommendations declined substantially. For corn, the number of programs making non-cash recommendations declined from 17 at the end of August 1995 to nine at the end of November (end of harvest period). For soybeans, only three programs had non-cash recommendations at the end of October (Ag Review, Agrimark and Allendale) and November 1995 (Ag Review, Agrimark and Zwicker). The average net amount sold using non-cash tools by the end of harvest for corn and soybeans were 4.6 percent and 3.5 percent, respectively, across all programs. The amount recommended sold via cash forward contracts increased significantly for both corn and soybeans from 24 percent at the end of August to 40 percent by the end November 1995.

Harvest represents the first period during the marketing window in which spot cash recommendations can be made. For corn, three advisory programs (Prosperous Farmer and both programs from Agri Edge) made spot cash recommendations as early as September 1995. The first soybean cash spot sales were recommended during November 1995. The average net amount of corn sold was 53 percent. This includes 13 percent via cash spot sales and 40 percent via forward contracts. Two programs finalized their corn marketing recommendations during November 1995: Allendale and Brock Hedging Strategy.

For soybeans, the programs recommended that an average of eight percent be sold via cash spot sales and forty percent be sold via cash forward contracts by the end of November 1995. Only one program (Brock Hedging Strategy) recommended selling 100 percent of soybeans by the end of harvest. This program did place a long call recommendation during July 1996.

Post-harvest recommendations were predominately cash spot recommendations. Between the end of November 1995 and the end of August 1996, cash spot recommendations increased from 13.2 percent to 52.4 percent of corn production and from 7.8 to 52 percent of soybean production. In contrast, the average cash forward recommendations increased from 39.8 percent to 47.6 percent of production for corn and from 39.6 percent to 48 percent of production

for soybeans. The average net amount of non-cash recommendations for both corn and soybeans is close to zero percent during the post-harvest period (December 1995 through August 1996).

By the end of April 1996, which is the beginning of the planting season for the 1996 crop, advisory programs had recommended an net amount sold averaging 93 percent of corn production and 86 percent of soybean production. Sixteen programs had finished their corn marketing recommendations for the 1995 marketing year while eight programs had finished their soybeans marketing recommendations.

As a final observation, it is interesting to compare the average marketing profile across advisory programs and the marketing profile for a simple strategy of marketing $1/24^{th}$ of a crop at the end of each month. This comparison is shown in Figure 51. For both corn and soybeans, advisory service recommendations lagged behind the benchmark until harvest, "catch-up" sales were made at harvest or shortly thereafter, and then tracked the benchmark fairly closely after harvest. Nevertheless, the equal monthly sales strategy did a reasonably good job of approximating the average behavior of the advisory programs.

Summary

Management of price volatility is an important business activity for crop producers. There is considerable evidence that crop producers highly value advisory services as a source of marketing information and advice. Differences in advisory service approaches to marketing should influence a farmer's choice of a service. However, information on the marketing "style" of different advisory services is exceedingly difficult for producers to obtain on their own, and virtually no previous research on this topic is available.

Marketing styles for the 25 market advisory service programs included in the AgMAS Project were developed in two steps. The first step was the construction of a detailed "menu" of the tools and strategies used by each of the advisory programs. The menu describes the type of pricing tool, frequency of transactions, and magnitude of transactions. The second step was the development of a daily index of the net amount sold by each market advisory program. To construct such an index, the various futures, options, and cash positions recommended for a program on a given day were weighted by the respective position "delta." When the daily values of the index were plotted for the entire marketing period, the marketing "profile" for a program was generated.

The results of the 1995 marketing style analysis for corn and soybeans suggest the following conclusions,

- Advisory programs made a relatively small number of recommendations. On average, each service made 12 recommendations for corn and 12 recommendations for soybeans during the entire marketing window. The total number of recommendations ranged from 4 to 23 for corn and from 2 to 31 for soybeans.

- Recommendations of the market advisory programs primarily involved cash marketing strategies, not futures and options. For corn, there were 104 cash forward contract recommendations and 68 cash spot recommendations. Combined, the two types of cash recommendations account for 57 percent of all corn recommendations. For soybeans, there were 89 cash forward contract recommendations and 82 cash spot recommendations, which together represent 59 percent of all soybean recommendations.

- A short futures position was the non-cash marketing strategy most recommended by this group of advisory programs. It represents 47 percent of all corn non-cash recommendations and 40 percent of all soybean non-cash recommendations.

- Short futures contracts were rarely used after harvest. All short futures recommendations were made and offset by the end of December 1995. Thus, very little storage was conducted via hedged storage. This finding is not surprising for corn, given the inverted futures markets during the storage period for the 1995 crop.

- Cash "re-ownership" strategies, whereby long positions in options and/or futures were taken after a previous cash sale of the commodity, were a relatively popular strategy. For corn, 15 of the 40 long futures, long call and short put recommendations were taken subsequent to previous cash sales (either cash spot or cash forward). For soybeans, 25 of the 48 long futures, long call and short put recommendations recommendations were taken subsequent to previous cash sales.

- Option contracts tended to be used in combination with other options or futures. For corn, the most common combinations were long calls with short futures (creating a synthetic long put), short calls with short futures, and short puts and short futures (creating a synthetic short call). For soybeans, the most common combinations were long calls in the money and short calls out of the money (fence), and long calls with short puts (creating a synthetic long futures).

- Non-cash marketing recommendations were typically held open for a short period of time. To illustrate, 38 percent of all non-cash recommendations for corn were offset before the first month, and 63 percent of all non-cash recommendations for soybeans were offset within one month.

- Despite the attention directed to hedge-to-arrive contracts during the 1995 marketing season, the programs were not heavy users of this tool. There were fifteen corn hedge-to-arrive recommendations issued by seven programs, and six soybean hedge-to-arrive recommendations issued by three programs. These represented 5 and 2 percent of all recommendations for corn and soybeans, respectively. Furthermore, the largest amount of crop sold using hedge-to-arrive contracts by any program was 75 percent for corn and 30 percent for soybeans. When averaged across all programs, the net amount sold through hedge-to-arrive contracts was 1.3 percent for soybeans and 5.4 percent for corn.

- The pre-harvest amount sold averaged 35 percent for corn and 30 percent for soybeans (end of August for corn and soybeans). This is much smaller than the typical estimates generated by optimal hedging models (e.g., Brorsen and Irwin).

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Advisory Program	Cash Spot	Cash Forward	Short Futures	Short Call	Long Put	Hedge to Arrive	Long Futures	Long Call	Short Put	Total Recommendations
AgLine	3	5			1					9
AgResource	3	2	1				3	1	1	11
AgReview	1	3	1	1	1	2		1	1	11
AgriEdge Hedging Strategy	5	4			2	1	1			13
AgriEdge Strictly Cash	4	3				1				8
Agrimark	5		3	1			2		4	15
Agri Visor Basic Hedge	1	3	2			2		3		11
Agri Visor Aggressive Hedge	3		4			1		2		10
Agri Visor Basic Cash	5					4				9
Agri Visor Aggressive Cash	3					4		3		10
Allendale	1		10							11
Brock Hedging Strategy		7	11	1	1			1		21
Brock Cash Only		8								8
Freese Notis	4	10								14
Grain Field	3	8	5		1		5	1		23
Harris Weather	2		1		1					4
Hjort Ag Profit	2	3			1					6
North American Ag	1	3	1		2					7
ProFarmer Hedging Strategy	1	4	2				1			8
ProFarmer Strictly Cash	3	2								5
Prosperous Farmer	3		9	1			3	4		20
Stewart Peterson Advisory	5	12	4		1				1	23
Stewart Peterson Strictly Cash	4	13								17
Top Farmer Intelligence	5	11	2							18
Zwicker	1	3	6		1		2			13
Number of Recommendations	68	104	62	4	12	15	17	16	7	305
Average Number of Recommendations/Program	2.7	4.2	2.5	0.2	0.5	0.6	0.7	0.6	0.3	12.2

Table 1. Total Number of Recommendations per Marketing Tool by Advisory Program, Corn, 1995

Advisory Program	Cash Spot	Cash Forward	Short Futures	Short Call	Long Put	Hedge to Arrive	Long Futures	Long Call	Short Put	Total Recommendations
AgLine	3	5								8
AgResource	5	1								6
AgReview	1	4	2	3	1			3		14
AgriEdge Hedging Strategy	4	2			1	1				8
AgriEdge Strictly Cash	4	4				1				9
Agrimark	5		2	2			7	2	3	21
Agri Visor Basic Hedge	2	3	1		1			3	2	12
Agri Visor Aggressive Hedge	2	3	2	1	2		1	3	2	16
Agri Visor Basic Cash	2	5								7
Agri Visor Aggressive Cash	2	3			2	4		2		13
Allendale	2		7							9
Brock Hedging Strategy		5	5	1			2	1		14
Brock Cash Only	1	6								7
Freese Notis	4	8								12
Grain Field	2	8	2				5	2		19
Harris Weather		1	1							2
Hjort Ag Profit	4	1			1					6
North American Ag	2	1	2		1					6
ProFarmer Hedging Strategy	5		1							6
ProFarmer Strictly Cash	6	1								7
Prosperous Farmer	2		6				1			9
Stewart Peterson Advisory	7	9	9	2				4		31
Stewart Peterson Strictly Cash	7	9								16
Top Farmer Intelligence	7	9	4							20
Zwicker	3	1	5				4	1		14
Number of Recommendations	82	89	49	9	9	6	20	21	7	292
Average Number of Recommendations/Program	3.3	3.6	2.0	0.4	0.4	0.2	0.8	0.8	0.3	11.7

Table 2. Number of Recommendations per Marketing Tool by Advisory Program, Soybeans, 1995

MARKETING STRATEGY	Sep 94	Oct 94	Nov 94	Dec 94	Jan 95	Feb 95	Mar 95	Apr 95	May 95	Jun 95	Jul 95	Aug 95	Sep 95	Oct 95	Nov 95	Dec 95	Jan 96	Feb 96	Mar 96	Apr 96	May 96	Jun 96	Jul 96	Aug 96
SHORT FUTURES																								
Programs Recommending Strategy	1	1	3	3	5	5	7	10	11	10	6	9	6	3	2	2								
Average Recommendation (%)[a]	10.0	10.0	23.3	23.3	30.0	32.0	30.4	34.8	46.6	49.5	62.5	51.1	50.0	58.3	37.5	52.5								
Maximum Recommendation (%)	10	10	25	25	30	50	50	70	100	100	100	100	100	100	25	75								
Minimum Recommendation (%)	10	10	20	20	20	20	15	20	20	20	25	10	25	25	25	30								
All Program Average (%)	0.4	0.4	2.8	2.8	6.0	6.4	8.5	13.9	20.5	19.8	15.0	18.4	12.0	7.0	3.0	4.2								
SHORT CALLS																								
Programs Recommending Strategy									1	3	2	1	1	1	1									
Average Recommendation (%)									20.0	46.7	60.0	20.0	20.0	20.0	20.0									
Maximum Recommendation (%)									20	100	100	20	20	20	20									
Minimum Recommendation (%)									20	20	20	20	20	20	20									
All Program Average (%)									0.8	5.6	4.8	0.8	0.8	0.8	0.8									
LONG PUTS																								
Programs Recommending Strategy									1	3	5	6	7	7	5			1	2	2	1	1		
Average Recommendation (%)									33.0	36.7	32.0	35.0	37.1	37.1	32.0			35.0	30.0	30.0	35.0	35.0		
Maximum Recommendation (%)									33	50	50	50	50	50	50			35	35	35	35	35		
Minimum Recommendation (%)									33	25	25	25	25	25	25			35	25	25	35	35		
All Program Average (%)									1.3	4.4	6.4	8.4	10.4	10.4	6.4			1.4	2.4	2.4	1.4	1.4		
HEDGE-TO-ARRIVE																								
Programs Recommending Strategy			2	2	2	4	5	5	5	5	5	6	6	5	5	5	5	5	1	1				
Average Recommendation (%)			20.0	20.0	20.0	20.0	21.0	21.0	27.0	27.0	39.0	36.7	36.7	48.0	44.0	40.0	40.0	40.0	25.0	25.0				
Maximum Recommendation (%)			20	20	20	20	25	25	35	35	65	65	65	75	75	55	55	55	25	25				
Minimum Recommendation (%)			20	20	20	20	20	20	20	20	20	20	20	25	25	25	25	25	25	25				
All Program Average (%)			1.6	1.6	1.6	3.2	4.2	4.2	5.4	5.4	7.8	8.8	8.8	9.6	8.8	8.0	8.0	8.0	1.0	1.0				

a: Percent Refers to Expected Production Before Harvest and Actual Production After Harvest

Table 3. Summary Statistics for Short Futures, Short Call, Long Put and Hedge-to-Arrive Recommendations, Corn, 1995.

MARKETING STRATEGY	Sep 94	Oct 94	Nov 94	Dec 94	Jan 95	Feb 95	Mar 95	Apr 95	May 95	Jun 95	Jul 95	Aug 95	Sep 95	Oct 95	Nov 95	Dec 95	Jan 96	Feb 96	Mar 96	Apr 96	May 96	Jun 96	Jul 96	Aug 96
SHORT FUTURES																								
Programs Recommending Strategy			1	1	2	4	5	7	7	7	4	7	5	3	4	4								
Average Recommendation (%)[a]			20.0	20.0	20.0	28.8	37.6	29.0	43.6	58.6	58.8	38.3	38.6	43.3	51.3	40.0								
Maximum Recommendation (%)			20	20	20	50	83	50	50	100	75	60	60	70	70	75								
Minimum Recommendation (%)			20	20	20	20	20	20	25	20	50	20	20	25	35	25								
All Program Average (%)			0.8	0.8	1.6	4.6	7.5	8.1	12.2	16.4	9.4	10.7	7.7	5.2	8.2	6.4								
SHORT CALLS																								
Programs Recommending Strategy							1	2	2	2			1	2	1	1	2	2	2	2	2	1		
Average Recommendation (%)							40.0	30.0	30.0	30.0			20.0	30.0	20.0	20.0	20.0	26.3	26.3	28.8	25.0	25.0		
Maximum Recommendation (%)							40	40	40	40			20	40	20	20	20	32.5	32.5	32.5	25	25		
Minimum Recommendation (%)							40	20	20	20			20	20	20	20	20	20	20	25	25	25		
All Program Average (%)							1.6	2.4	2.4	2.4			0.8	2.4	0.8	0.8	1.6	2.1	2.1	2.3	2.0	1.0		
LONG PUTS																								
Programs Recommending Strategy							1			1	1	1	1	1		1	3	4	1		2	2		
Average Recommendation (%)							50.0			50.0	50.0	50.0	50.0	50.0		50.0	25.0	28.8	40.0		37.5	37.5		
Maximum Recommendation (%)							50			50	50	50	50	50		50	25	40	40		50	50		
Minimum Recommendation (%)							50			50	50	50	50	50		50	25	25	40		25	25		
All Program Average (%)							2.0			2.0	2.0	2.0	2.0	2.0		2.0	3.0	4.6	1.6		3.0	3.0		
HEDGE-TO-ARRIVE																								
Programs Recommending Strategy							2	2	2	2	2	2	2		1	1	1	1	1	1	1	1		
Average Recommendation (%)							20.0	20.0	20.0	20.0	20.0	20.0	20.0		30.0	30.0	30.0	30.0	30.0	15.0	15.0	15.0		
Maximum Recommendation (%)							20	20	20	20	20	20	20		30	30	30	30	30	15	15	15		
Minimum Recommendation (%)							20	20	20	20	20	20	20		30	30	30	30	30	15	15	15		
All Program Average (%)							1.6	1.6	1.6	1.6	1.6	1.6	1.6		1.2	1.2	1.2	1.2	1.2	0.6	0.6	0.6		

a: Percent Refers to Expected Production Before Harvest and Actual Production After Harvest

Table 4. Summary Statistics for Short Futures, Short Call, Long Put and Hedge-to-Arrive Recommendations, Soybeans, 1995.

MARKETING STRATEGY	Sep 94	Oct 94	Nov 94	Dec 94	Jan 95	Feb 95	Mar 95	Apr 95	May 95	Jun 95	Jul 95	Aug 95	Sep 95	Oct 95	Nov 95	Dec 95	Jan 96	Feb 96	Mar 96	Apr 96	May 96	Jun 96	Jul 96	Aug 96
LONG FUTURES																								
Programs Recommending Strategy									2	3	3	1	1	1	3	3	2	2	2	1	2			1
Average Recommendation (%)[a]									25.0	61.7	35.0	20.0	20.0	20.0	27.5	44.2	31.3	67.5	60.0	35.0	21.5			10.0
Maximum Recommendation (%)									25	100	50	20	20	20	50	100	50	100	70	35	25			10
Minimum Recommendation (%)									25	25	20	20	20	20	12.5	12.5	12.5	35	50	35	18			10
All Program Average (%)									2.0	7.4	4.2	0.8	0.8	0.8	3.3	5.3	2.5	5.4	4.8	1.4	1.7			0.4
LONG CALLS																								
Programs Recommending Strategy					2	5	5	5	6	5	5	5	5	6	6	3	3							
Average Recommendation (%)					50.0	35.0	45.0	45.0	54.2	45.0	45.0	55.0	55.0	33.3	40.2	38.7	38.7							
Maximum Recommendation (%)					50	50	50	50	100	100	100	150	150	50	50	50	50							
Minimum Recommendation (%)					50	25	25	25	25	25	25	25	25	25	25	33	33							
All Program Average (%)					4.0	7.0	9.0	9.0	13.0	9.0	9.0	11.0	11.0	8.0	9.6	4.6	4.6							
SHORT PUTS																								
Programs Recommending Strategy					2	2	2	2	3	3	2	2	3	3	3		1	1						
Average Recommendation (%)					35.0	35.0	45.0	45.0	30.0	28.3	17.5	17.5	20.0	20.0	20.0		20.0	20.0						
Maximum Recommendation (%)					50	50	50	50	50	50	20	20	25	25	25		20	20						
Minimum Recommendation (%)					20	20	40	40	40	15	15	15	15	15	15		20	20						
All Program Average (%)					2.8	2.8	3.6	3.6	3.6	3.4	1.4	1.4	2.4	2.4	2.4		0.8	0.8						

a: Percent Refers to Expected Production Before Harvest and Actual Production After Harvest

Table 5. Summary Statistics for Long Futures, Long Call and Short Put Recommendations, Corn, 1995

MARKETING STRATEGY	Sep 94	Oct 94	Nov 94	Dec 94	Jan 95	Feb 95	Mar 95	Apr 95	May 95	Jun 95	Jul 95	Aug 95	Sep 95	Oct 95	Nov 95	Dec 95	Jan 96	Feb 96	Mar 96	Apr 96	May 96	Jun 96	Jul 96	Aug 96
LONG FUTURES																								
Programs Recommending Strategy										2	2	1	1	2	2	1	2	2	3	4	2			
Average Recommendation (%)[a]										62.5	60.0	20.0	40.0	35.0	35.0	20.0	25.0	32.5	43.3	31.3	19.5			
Maximum Recommendation (%)										100	100	20	40	40	40	20	30	40	50	50	14			
Minimum Recommendation (%)										25	20	20	40	30	30	20	20	25	20	20	14			
All Program Average (%)										5.0	4.8	0.8	1.6	2.8	2.8	0.8	2.0	2.6	5.2	5.0	1.6			
LONG CALLS																								
Programs Recommending Strategy						1	1	1	1	3	4	4	5	2	1	1	3	4	4	4	1	2	3	2
Average Recommendation (%)						50.0	50.0	50.0	50.0	33.3	36.3	28.8	29.0	25.0	15.0	25.0	23.3	38.1	38.1	44.4	25.0	37.5	50.0	37.5
Maximum Recommendation (%)						50	50	50	50	50	70	45	45	30	15	25	25	50	50	50	25	50	50	50
Minimum Recommendation (%)						50	50	50	50	25	25	20	20	20	15	25	20	20	20	32.5	25	25	50	25
All Program Average (%)						2.0	2.0	2.0	2.0	4.0	5.8	4.6	5.8	2.0	0.6	1.0	2.8	6.1	6.1	7.1	1.0	3.0	6.0	3.0
SHORT PUTS																								
Programs Recommending Strategy						1	1	1	1	2	2	2	2	3	1	1	1	1						
Average Recommendation (%)						50.0	50.0	50.0	50.0	25.0	25.0	25.0	25.0	23.3	20.0	53.0	53.0	33.0						
Maximum Recommendation (%)						50	50	50	50	25	25	25	25	25	20	53	53	33						
Minimum Recommendation (%)						50	50	50	50	25	25	25	25	20	20	53	53	33						
All Program Average (%)						2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.8	0.8	2.1	2.1	1.3						

a: Percent Refers to Expected Production Before Harvest and Actual Production After Harvest

Table 6. Summary Statistics for Long Futures, Long Call and Short Put Recommendations, Soybeans, 1995

Derivative Marketing Tool	Recommended in a Combination With Other Derivatives Only	Recommended in a Combination With Forward Contracts Only	Recommended in a Combination with Other Derivatives and Forward Contracts	Total
Short Futures	13	Not Included	15	28
Short Calls	2	0	2	4
Long Puts	1	2	6	9
Long Futures	4	6	0	10
Long Calls	8	1	4	13
Short Puts	4	0	2	6

Table 7. Number of Recommended Combinations Involving Futures and Options Positions, Corn, 1995.

Derivative Marketing Tool	Recommended in a Combination With Other Derivatives Only	Recommended in a Combination With Forward Contracts Only	Recommended in a Combination with Other Derivatives and Forward Contracts	Total
Short Futures	2	Not Included	9	11
Short Calls	5	0	4	9
Long Puts	1	4	1	6
Long Futures	5	5	2	12
Long Calls	4	4	6	14
Short Puts	2	0	4	6

Table 8. Number of Recommended Combinations Involving Futures and Options Positions, Soybeans, 1995.

Combination	Common Name (If any)	Number of Times Recommended
Long Call and Short Futures	Synthetic Long Put	9
Long Call and Long Futures		1
Long Call and Short Put	Synthetic Long Futures	1
Long Call and Long Put	Butterfly Spread	1
Long Call and Short Futures and Short Call		1
Long Call and Short Futures and Short Call and Long Futures		1
Long Call and Short Call and Short Put and Long Put		1
Short Call and Short Futures		4
Short Call and Short Put and Short Futures	Synthetic Short Call	2
Short Call and Long Put and Short Put		1
Short Put and Short Futures	Synthetic Short Call	4
Short Put and Long Futures		2
Long Put and Short Futures		3

Table 9. Combinations of Non-Cash Marketing Tools, Corn, 1995.

Combination	Common Name (If any)	Number of Times Recommended
Long Call and Short Call	Fence	5
Long Call and Short Put	Synthetic Long Futures	3
Long Call and Short Futures	Synthetic Long Put	2
Long Call and Long Put	Butterfly Spread	1
Long Call and Short Futures and Long Futures		1
Long Call and Short Put and Short Futures		1
Long Call and Short Put and Short Futures and Short Call		1
Long Call and Short Call and Short Futures		1
Long Call and Long Futures		1
Short Call and Long Futures and Short Put	Synthetic Short Put	3
Short Call and Short Put	Reversed Butterfly	2
Short Call and Short Futures		1
Short Call and Long Put	Synthetic Short Futures	1
Short Put and Long Futures		2
Short Futures and Long Futures		1

Table 10. Combinations of Non-Cash Marketing Tools, Soybeans, 1995.

Advisory Program	Short Futures Ave.	Min.	Max.	Short Call Ave.	Min.	Max.	Long Put Ave.	Min.	Max.	Hedge to Arrive Ave.	Min.	Max.	Long Futures Ave.	Min.	Max.	Long Call Ave.	Min.	Max.	Short Put Ave.	Min.	Max.
AgLine							104	104	104												
AgResource	9	9	9										27	10	52	211	211	211	95	95	95
AgReview	2	2	2	103	103	103	103	103	103	139	105	172				12	12	12	103	103	103
AgriEdge Hedging Strategy							42	31	52	151	151	151	7	7	7						
AgriEdge Strictly Cash										151	151	151									
Agrimark	54	28	75	34	34	34							46	24	67				67	27	107
Agri Visor Basic Hedge	93	66	119							112	96	127				97	49	176			
Agri Visor Aggressive Hedge	38	7	119							96	96	96				113	49	176			
Agri Visor Basic Cash										177	96	257									
Agri Visor Aggressive Cash										177	96	257				97	49	176			
Allendale	161	70	314																		
Brock Hedging Strategy	21	2	39				43	43	43							92	92	92			
Brock Cash Only																					
Freese Notis																					
Grain Field	4	1	13				81	81	81				16	3	27	14	14	14			
Harris Weather	12	12	12				32	32	32												
Hjort Ag Profit							3	3	3												
North American Ag	27	27	27				98	82	114												
ProFarmer Hedging Strategy	8	6	10										13	13	13						
ProFarmer Strictly Cash																					
Prosperous Farmer	43	8	91	31	31	31							16	3	36	49	25	86			
Stewart Peterson Advisory	8	3	12				11	11	11										31	31	31
Stewart Peterson Strictly Cash																					
Top Farmer Intelligence	9	5	12																		
Zwicker	9	2	18				81	81	81				21	14	27						
All Programs	47	1	314	56	31	103	61	3	114	154	96	257	21	3	67	83	12	211	71	27	107

Table 11. Number of Tradedays Recommendations Were Held Open by Marketing Strategy and Advisory Program, Corn, 1995.

Advisory Program	Short Futures			Short Call			Long Put			Hedge to Arrive			Long Futures			Long Call			Short Put		
	Ave.	Min.	Max.	Ave.	Min.	Max.	Ave.	Min.	Max.	Ave.	Min.	Max.	Ave.	Min.	Max.	Ave.	Min.	Max.	Ave.	Min.	Max.
AgLine																					
AgResource																					
AgReview	17	8	25	22	5	42	14	14	14							25	11	42			
AgriEdge Hedging Strategy							23	23	23	144	144	144									
AgriEdge Strictly Cash										144	144	144									
Agrimark	31	26	36	58	52	63							20	4	34	66	16	116	59	43	78
Agri Visor Basic Hedge	4	4	4				55	55	55							35	30	46	33	16	49
Agri Visor Aggressive Hedge	17	30	4	22	22	22	22	22	22				14	14	14	35	30	46	33	16	49
Agri Visor Basic Cash																					
Agri Visor Aggressive Cash							24	3	45	59	36	79				19	8	29			
Allendale	145	22	268													15	15	15			
Brock Hedging Strategy	28	7	47	71	71	71							10	8	11						
Brock Cash Only																					
Freese Notis																					
Grain Field	2	1	2										8	2	22	7	6	8			
Harris Weather	11	11	11																		
Hjort Ag Profit							3	3	3												
North American Ag	19	17	20				83	83	83												
ProFarmer Hedging Strategy	22	22	22																		
ProFarmer Strictly Cash																					
Prosperous Farmer	21	3	43										10	10	10						
Stewart Peterson Advisory	5	2	14	29	19	38										35	10	54			
Stewart Peterson Strictly Cash																					
Top Farmer Intelligence	11	7	15																		
Zwicker	6	1	13										12	2	22	3	3	3			
All Programs	33	1	268	37	5	71	26	3	83	87	36	144	13	2	34	30	3	116	44	16	78

Table 12. Number of Tradedays Recommendations Were Held Open by Marketing Strategy and Advisory Program, Soybeans, 1995.

Period	Frequency	Percent	Cumulative Percent
1 Week	15	13%	13%
2-4 Weeks	35	30%	43%
5-8 Weeks	21	18%	61%
9-12 Weeks	13	11%	72%
13-16 Weeks	9	8%	79%
17-20 Weeks	11	9%	89%
21-24 Weeks	3	3%	91%
25-28 Weeks	2	2%	93%
29-32 Weeks	4	3%	97%
> 32 Weeks	4	3%	100%

Table 13. Distribution of the Length of Time Non-Cash Recommendations (excluding hedge-to-arrive) Were Held Open by Advisory Programs, Corn, 1995.

Period	Frequency	Percent	Cumulative Percent
1 Week	24	21%	21%
2-4 Weeks	49	43%	63%
5-8 Weeks	22	19%	83%
9-12 Weeks	10	9%	91%
13-16 Weeks	5	4%	96%
17-20 Weeks	0	0%	96%
21-24 Weeks	2	2%	97%
25-28 Weeks	1	1%	98%
29-32 Weeks	0	0%	98%
> 32 Weeks	2	2%	100%

Table 14. Distribution of the Length of Time Non-Cash Recommendations (excluding hedge-to-arrive) Were Held Open by Advisory Programs, Soybeans, 1995.

MARKETING STRATEGY	Sep 94	Oct 94	Nov 94	Dec 94	Jan 95	Feb 95	Mar 95	Apr 95	May 95	Jun 95	Jul 95	Aug 95	Sep 95	Oct 95	Nov 95	Dec 95	Jan 96	Feb 96	Mar 96	Apr 96	May 96	Jun 96	Jul 96	Aug 96
AGGREGATED NON-CASH RECOMMENDATIONS																								
Programs Recommending Strategy	1	1	4	5	9	10	13	16	16	17	17	17	16	13	9	7	8	6	4	1	1			
Average Recommendation (%)[a]	10.0	10.0	22.5	22.0	18.4	13.8	15.9	20.7	16.8	14.7	18.1	15.0	12.4	10.9	12.7	7.6	17.5	-10.6	-3.0	5.5	0.6			
Maximum Recommendation (%)	10.0	10.0	25.0	25.0	50.0	40.0	50.0	60.0	80.0	90.0	100.0	100.0	100.0	75.0	55.0	55.0	55.0	25.0	25.0	5.5	0.6			
Minimum Recommendation (%)	10.0	10.0	20.0	20.0	-33.2	-33.5	-34.3	-34.7	-36.4	-35.9	-41.2	-93.7	-48.3	-49.2	-50.0	-50.0	-50.0	-50.0	-35.0	5.5	0.6			
All Program Average (%)	0.4	0.4	3.6	4.4	6.6	5.5	8.2	13.2	10.7	10.0	12.3	10.2	7.9	5.6	4.6	2.1	5.6	-2.5	-0.5	0.2	0.0			
CASH FORWARD																								
Programs Recommending Strategy						4	4	8	14	14	15	17	17	18	18	18	18	18	18	18	18	18	18	18
Average Recommendation (%)						15.0	20.0	20.6	24.6	30.4	37.0	35.9	38.5	43.9	55.3	57.5	65.6	65.8	66.1	66.1	66.1	66.1	66.1	66.1
Maximum Recommendation (%)						25.0	25.0	25.0	35.0	40.0	50.0	50.0	60.0	70.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Minimum Recommendation (%)						10.0	15.0	15.0	15.0	15.0	25.0	20.0	25.0	20.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
All Program Average (%)						2.4	3.2	6.6	13.8	17.0	22.2	24.4	26.2	31.6	39.8	41.4	47.2	47.4	47.6	47.6	47.6	47.6	47.6	47.6
CASH SPOT																								
Programs Recommending Strategy													3	4	8	10	11	13	15	23	23	23	23	23
Average Recommendation (%)													30.0	47.5	41.3	47.0	51.4	63.5	62.3	49.3	51.5	54.1	55.7	57.0
Maximum Recommendation (%)													50.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Minimum Recommendation (%)													20.0	20.0	20.0	20.0	15.0	10.0	5.0	5.0	10.0	10.0	15.0	20.0
All Program Average (%)													3.6	7.6	13.2	18.8	22.6	33.0	37.4	45.4	47.4	49.8	51.2	52.4
AGGREGATE AMOUNT SOLD																								
Programs Recommending Strategy	1	1	4	5	9	13	15	19	23	22	24	25	25	24	24	25	25	25	25	25	25	25	25	25
Average Recommendation (%)	10.0	10.0	22.5	22.0	18.4	15.2	19.1	26.1	26.7	30.7	35.9	34.6	37.7	46.7	60.0	62.3	75.4	77.9	84.5	93.2	95.0	97.4	98.8	100.0
Maximum Recommendation (%)	10.0	10.0	25.0	25.0	50.0	47.1	59.1	69.4	80.0	90.0	100.0	100.0	100.0	100.0	125.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Minimum Recommendation (%)	0.0	0.0	0.0	0.0	-33.2	-33.5	-34.3	-34.7	-21.4	-15.4	-31.3	-93.7	-24.1	-19.2	-20.0	-20.0	-20.0	-20.0	35.0	70.0	65.6	75.0	90.0	100.0
All Program Average (%)	0.4	0.4	3.6	4.4	6.6	7.9	11.4	19.8	24.5	27.0	34.5	34.6	37.7	44.8	57.6	62.3	75.4	77.9	84.5	93.2	95.0	97.4	98.8	100.0

a: Percent Refers to Expected Production Before Harvest and Actual Production After Harvest

Table 15. Summary Statistics of Aggregate Non-Cash Recommendations, Cash Forward Recommendations, Spot Cash Recommendations, and Aggregate Amount Sold Recommendations, Corn, 1995.

MARKETING STRATEGY	Sep 94	Oct 94	Nov 94	Dec 94	Jan 95	Feb 95	Mar 95	Apr 95	May 95	Jun 95	Jul 95	Aug 95	Sep 95	Oct 95	Nov 95	Dec 95	Jan 96	Feb 96	Mar 96	Apr 96	May 96	Jun 96	Jul 96	Aug 96
AGGREGATED NON-CASH RECOMMENDATIONS																								
Programs Recommending Strategy			1	1	2	5	6	8	9	11	7	11	7	3	3	3	6	7	6	2	4	2	2	
Average Recommendation (%)[a]			20.0	20.0	20.0	14.3	17.4	20.6	30.6	19.2	24.0	11.4	4.0	26.2	29.5	5.4	6.2	-14.2	-24.8	5.2	8.2	-5.2	-5.5	
Maximum Recommendation (%)			20.0	20.0	20.0	50.0	34.0	43.3	50.0	100.0	60.0	60.0	60.0	70.0	50.0	33.6	31.6	30.0	0.0	15.0	17.9	-4.7	-0.9	
Minimum Recommendation (%)			20.0	20.0	20.0	-43.4	-22.9	-18.7	1.2	-45.7	-6.1	-22.2	-20.0	-26.4	-26.5	-14.0	-34.0	-25.0	-30.0	-4.7	-8.2	-5.7	-10.1	
All Program Average (%)			0.8	0.8	1.6	2.9	4.2	6.6	11.0	8.5	6.7	5.0	1.1	3.1	3.5	0.6	1.5	-4.0	-6.0	0.4	1.3	-0.4	-0.4	
CASH FORWARD																								
Programs Recommending Strategy						1	6	11	15	15	19	19	19	20	20	20	20	21	21	21	21	21	21	21
Average Recommendation (%)						15.0	21.7	20.9	23.7	27.7	31.1	31.3	37.9	40.8	49.5	50.0	53.0	55.7	55.7	55.7	56.2	56.2	56.7	57.1
Maximum Recommendation (%)						15.0	30.0	30.0	45.0	55.0	55.0	55.0	65.0	65.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Minimum Recommendation (%)						15.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
All Program Average (%)						0.6	5.2	9.2	14.2	16.6	23.6	23.8	28.8	32.6	39.6	40.0	42.4	46.8	46.8	46.8	47.2	47.2	47.6	48.0
CASH SPOT																								
Programs Recommending Strategy															6	10	14	14	16	21	22	22	22	23
Average Recommendation (%)															32.5	30.8	32.7	38.4	40.0	46.4	46.4	50.0	52.0	56.5
Maximum Recommendation (%)															70.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Minimum Recommendation (%)															10.0	10.0	5.0	5.0	10.0	10.0	10.0	10.0	10.0	15.0
All Program Average (%)															7.8	12.3	18.3	21.5	25.6	39.0	40.8	44.0	45.8	52.0
AGGREGATE AMOUNT SOLD																								
Programs Recommending Strategy			1	1	2	6	11	17	21	22	22	23	22	22	23	23	24	25	25	25	25	25	25	25
Average Recommendation (%)			20.0	20.0	20.0	14.4	21.3	23.2	30.0	28.5	34.5	31.3	34.0	40.6	55.4	57.6	64.8	64.3	66.4	86.2	89.3	90.8	93.0	100.0
Maximum Recommendation (%)			20.0	20.0	20.0	50.0	64.0	73.3	73.9	100.0	80.0	70.0	65.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	117.9	100.0	100.0	100.0
Minimum Recommendation (%)			0.0	0.0	0.0	-43.4	-22.9	-18.7	1.2	-45.7	-6.1	-20.0	-20.0	-26.4	-26.5	0.0	-1.0	10.0	25.0	60.0	60.0	65.0	75.0	100.0
All Program Average (%)			0.8	0.8	1.6	3.5	9.4	15.8	25.2	25.1	30.3	28.8	29.9	35.7	50.9	53.0	62.2	64.3	66.4	86.2	89.3	90.8	93.0	100.0

a: Percent Refers to Expected Production Before Harvest and Actual Production After Harvest

Table 16. Summary Statistics of Aggregate Non-Cash Recommendations, Cash Forward Recommendations, Spot Cash Recommendations, and Aggregate Amount Sold Recommendations, Soybeans, 1995.

Marketing Tool	Delta
Cash Spot Sales	+1
Cash Forward Contract	+1
Short Futures	+1
Long Futures	-1
Hedge-to-Arrive	+1
Long Put	$0 \leq x \leq 1$
Short Call	$0 \leq x \leq 1$
Short Put	$-1 \leq x \leq 0$
Long Call	$-1 \leq x \leq 0$

Table 17. Assumed Delta Values of Selected Marketing Tools for the Purposes of Evaluating Downside Price Exposure of a Grain Farmer.
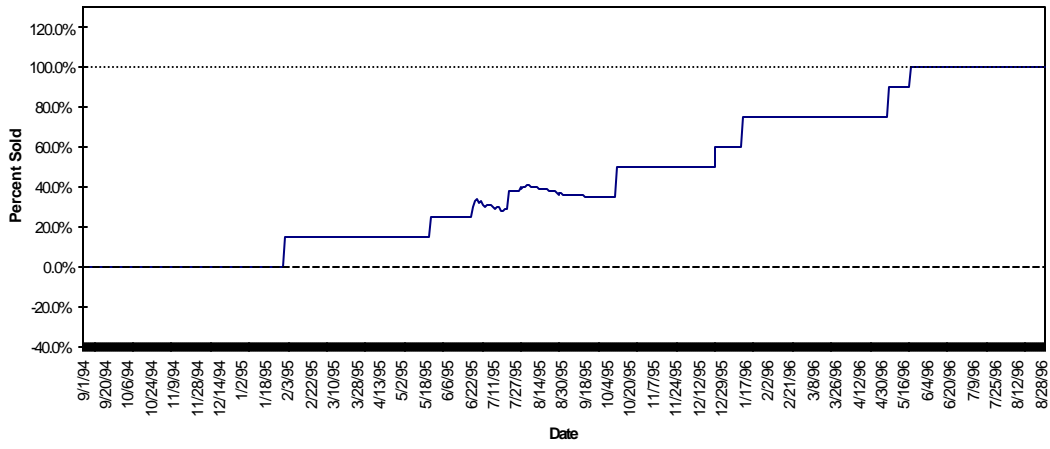
Figure 1. Ag Line Marketing Profile, Corn, 1995.
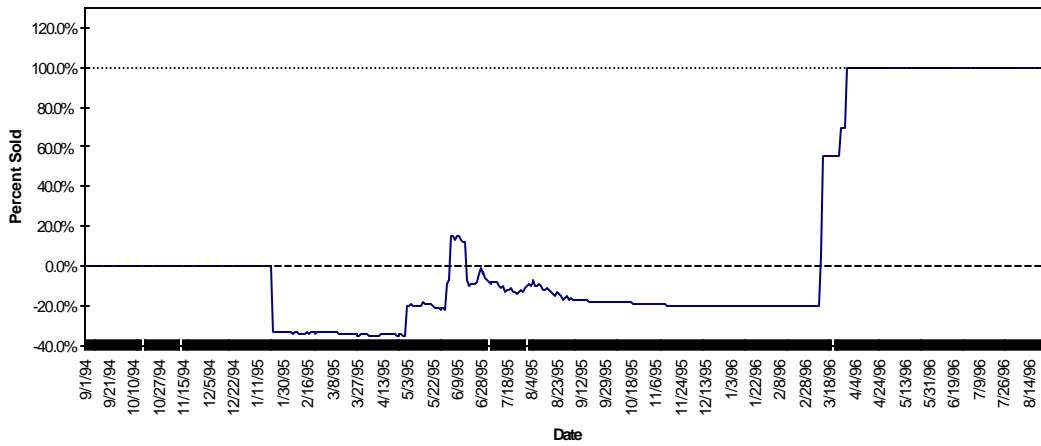
Figure 2. Ag Resource Marketing Profile, Corn, 1995.
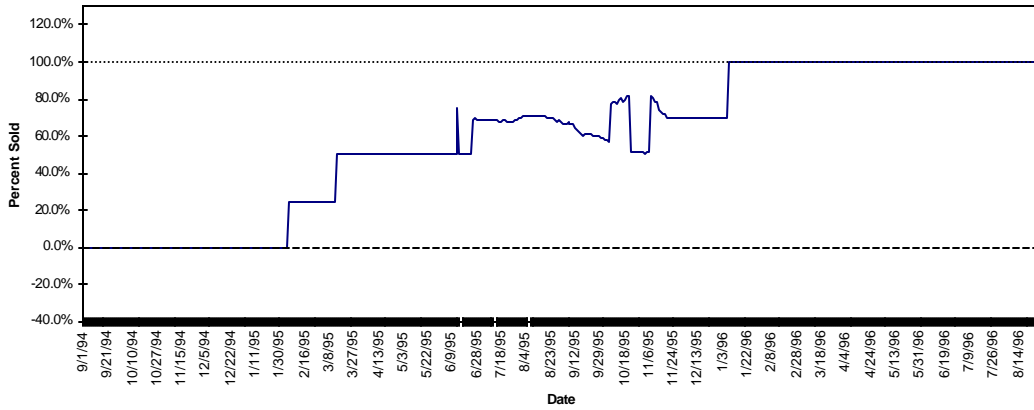
Figure 3. Ag Review Marketing Profile, Corn, 1995.
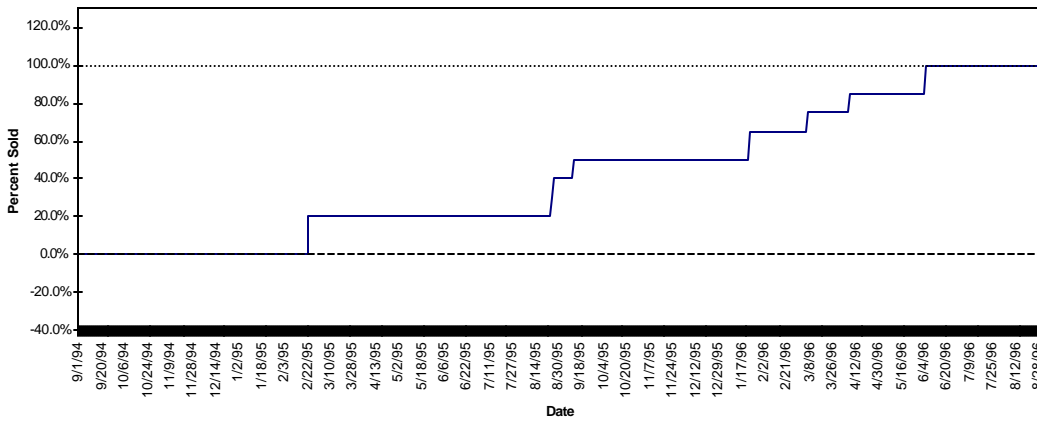
Figure 4. Agri Edge Cash Only Strategy Marketing Profile, Corn, 1995.
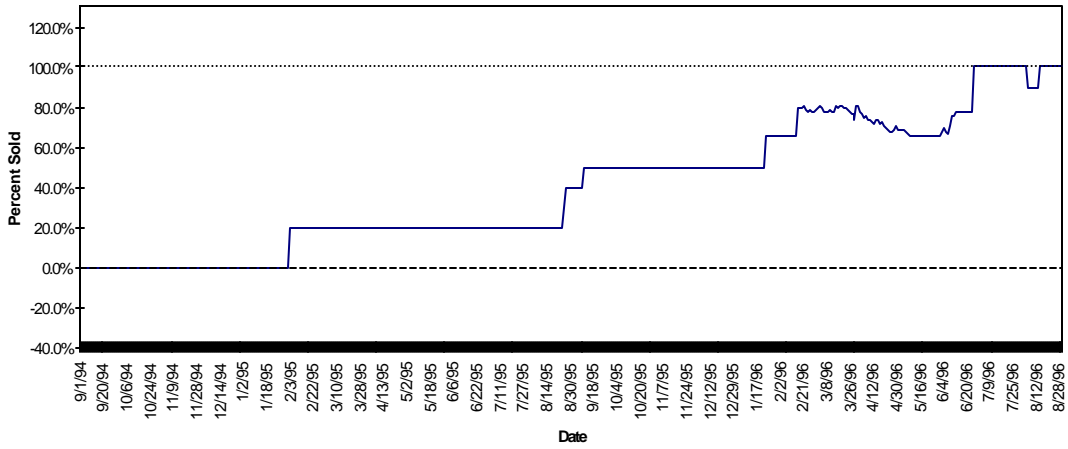
Figure 5. Agri Edge Hedge Strategy Marketing Profile, Corn, 1995.
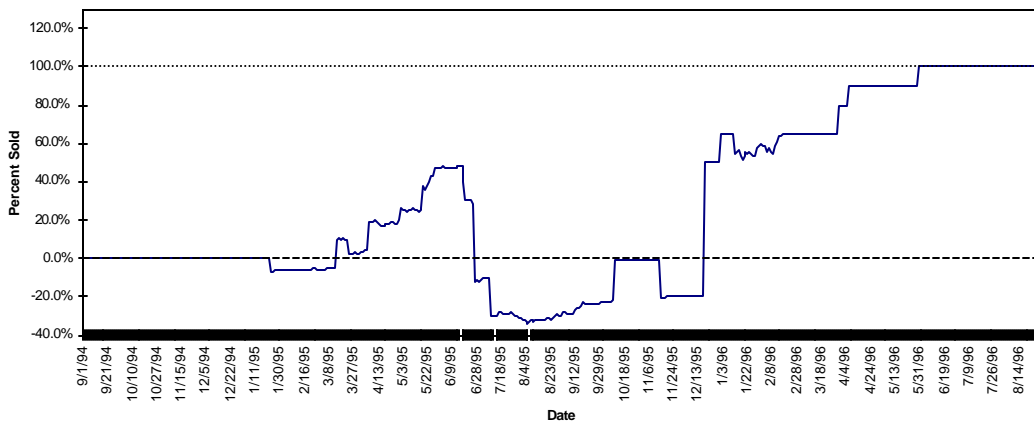
Figure 6. Agri Mark Marketing Profile, Corn, 1995.
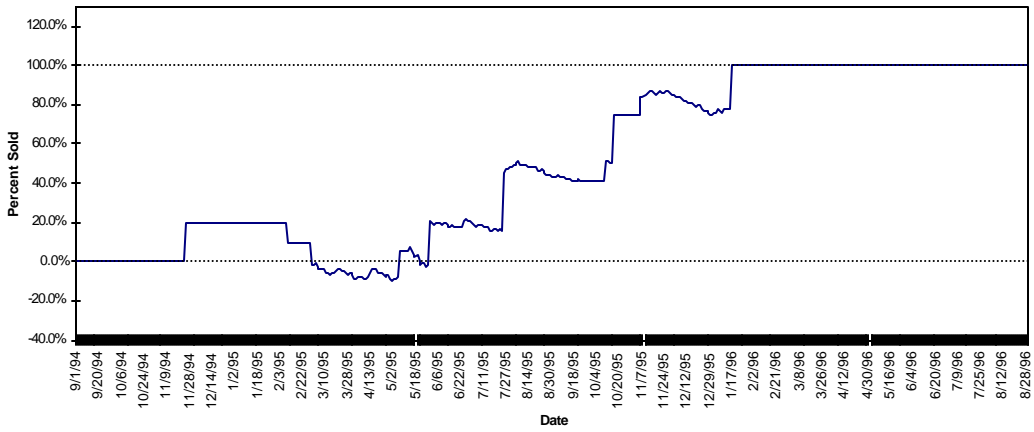
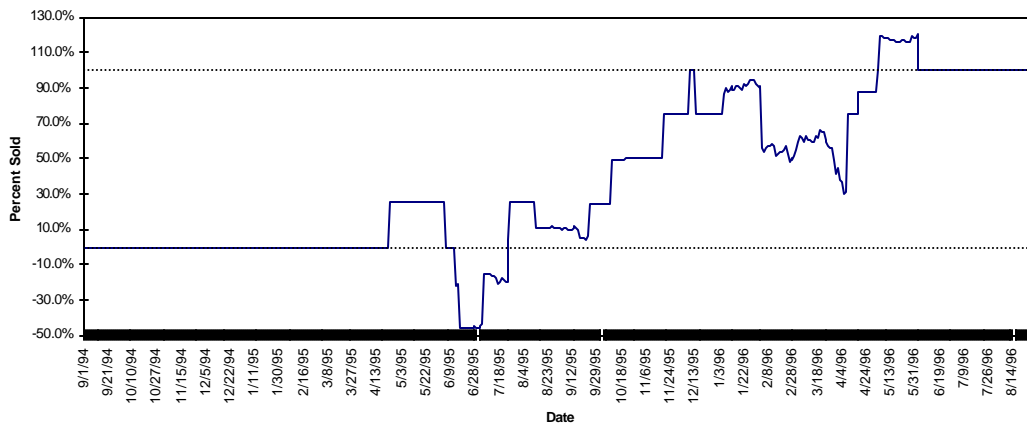**Figure 7. Agri Visor Aggressive Cash Marketing Profile, Corn, 1995.**
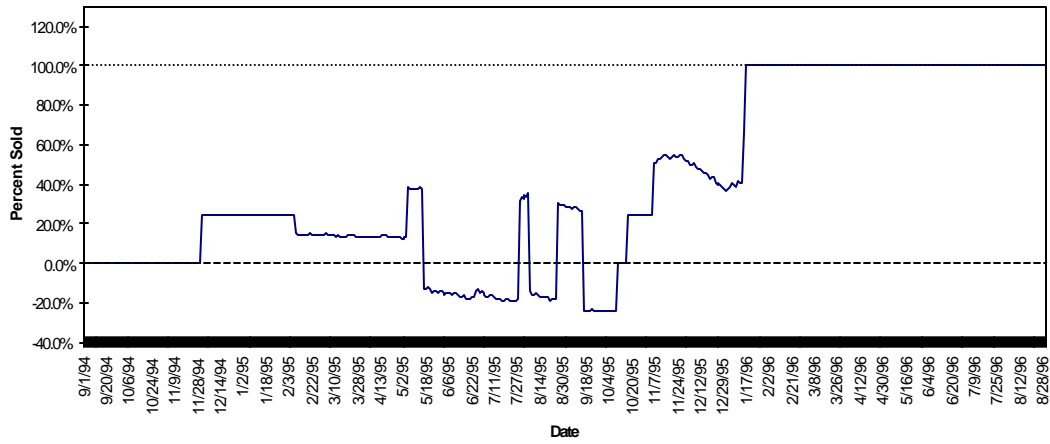
Figure 8. Agri Visor Aggressive Hedge Marketing Profile, Corn, 1995.
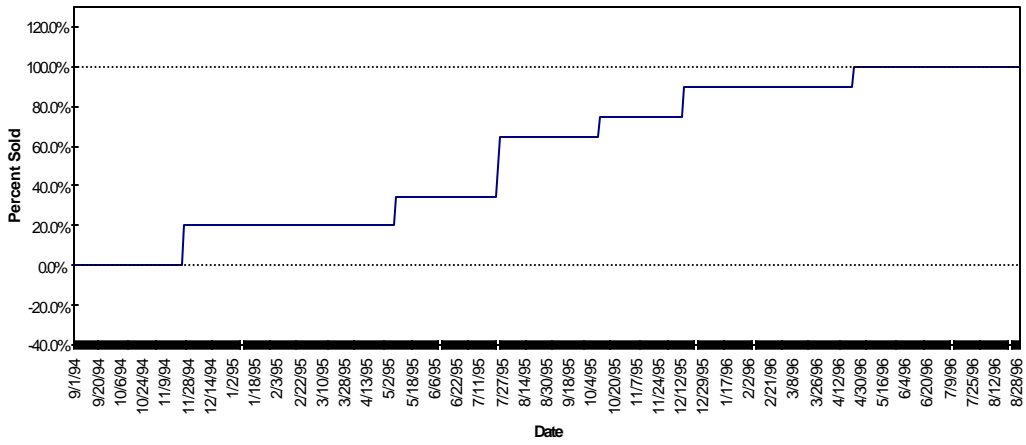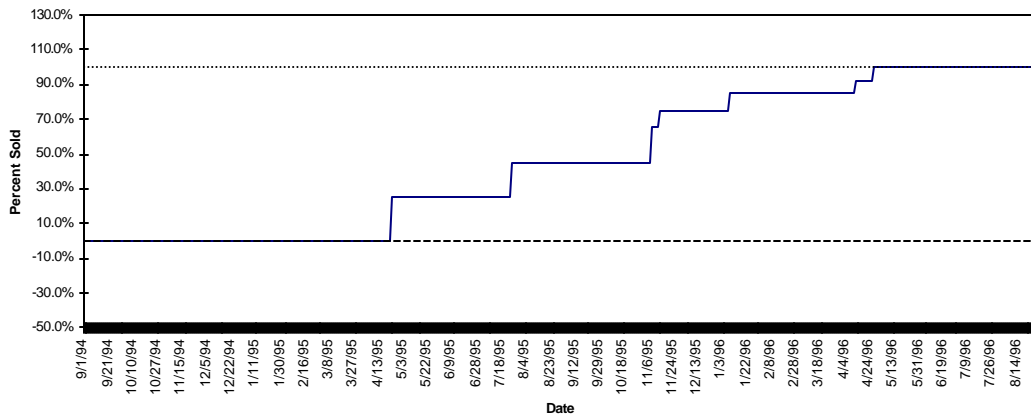
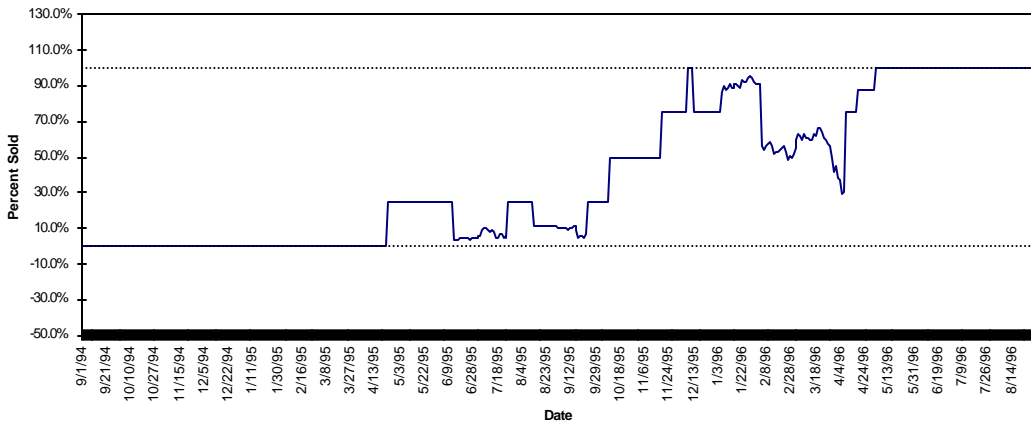**Figure 9. Agri Visor Basic Cash Marketing Profile, Corn, 1995.**
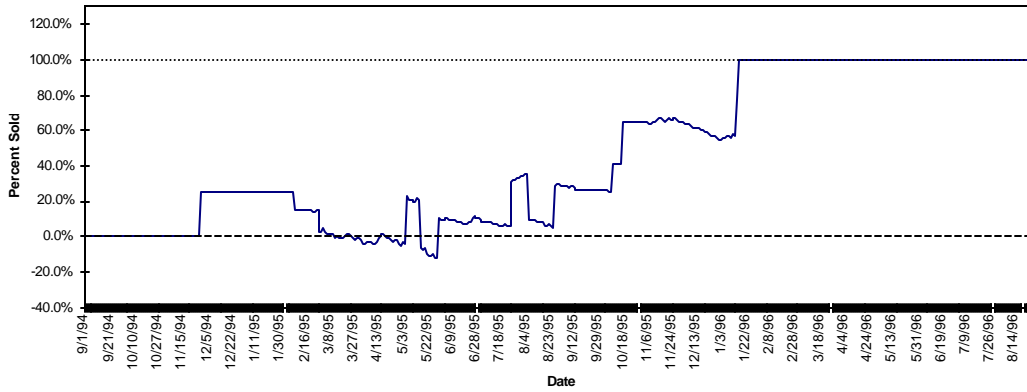
**Figure 10. Agri Visor Basic Hedge Marketing Profile, Corn, 1995.**
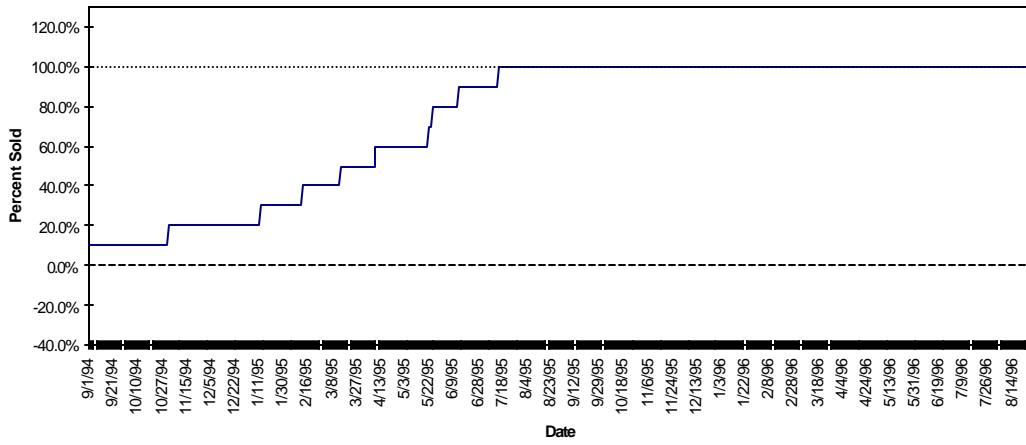
**Figure 11. Allendale Marketing Profile, Corn, 1995.**
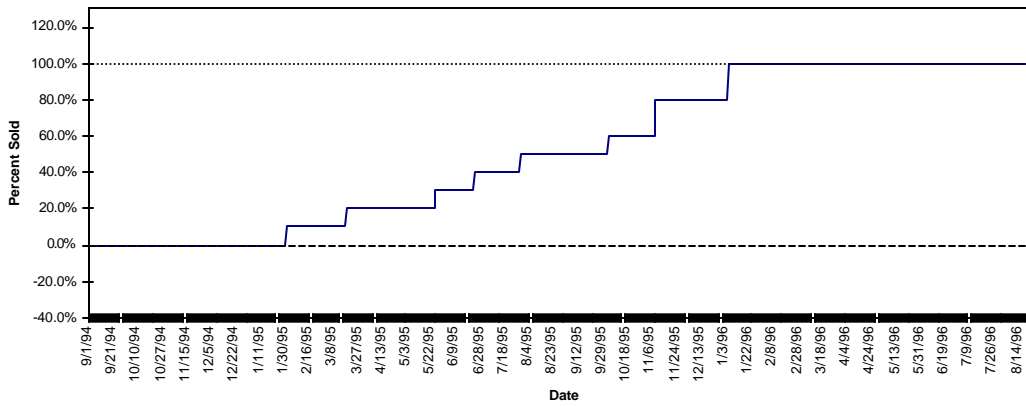
Figure 12. Brock Cash Only Marketing Profile, Corn, 1995.
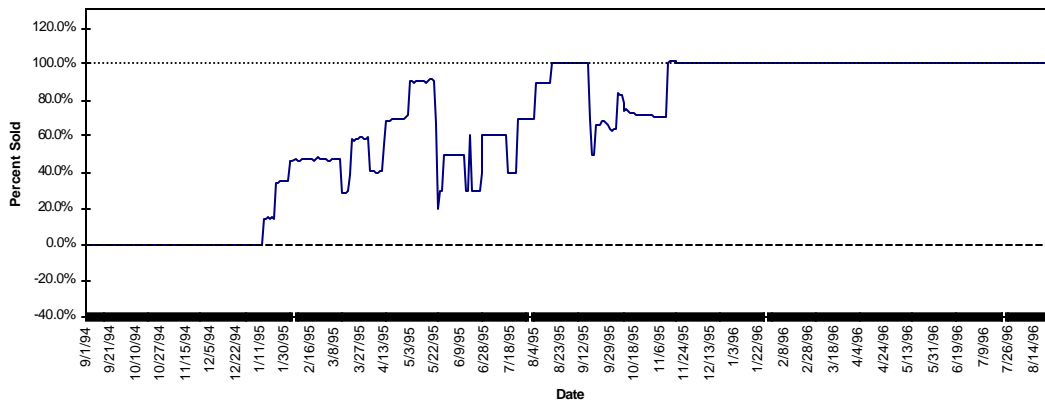
Figure 13. Brock Hedging Marketing Profile, Corn, 1995.
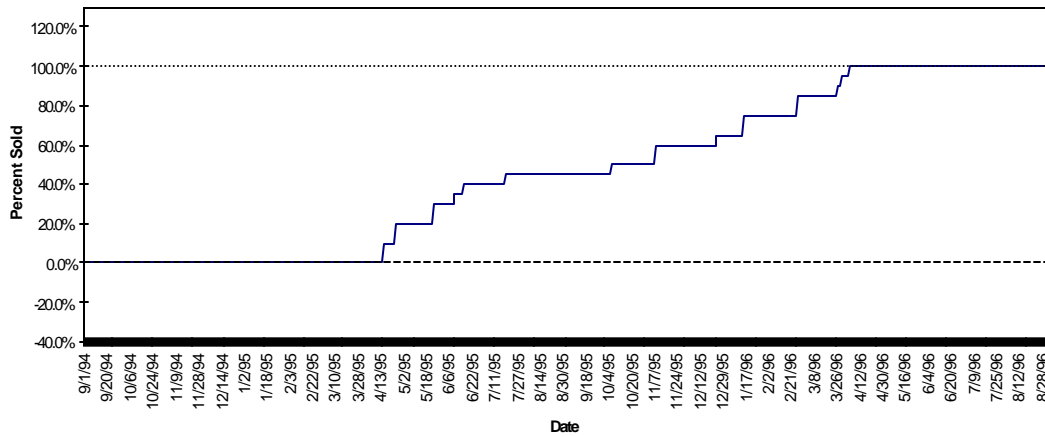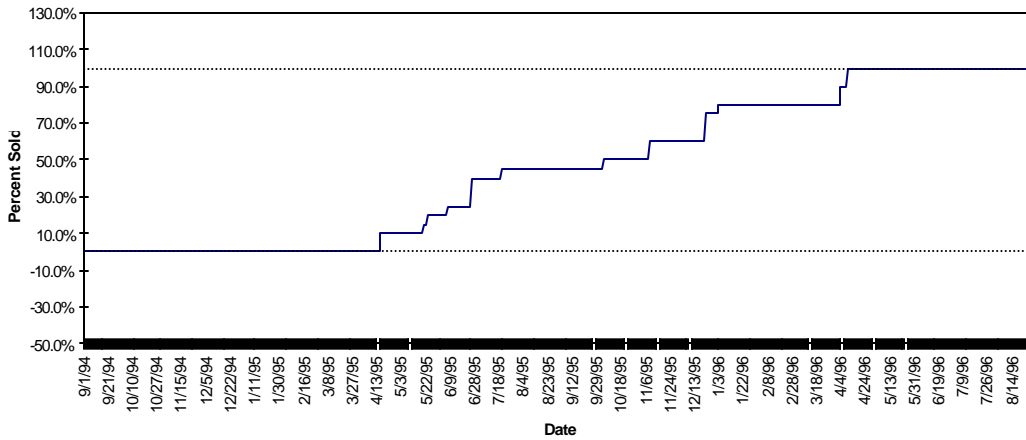

Figure 14. Freese Notis Marketing Profile, Corn, 1995.
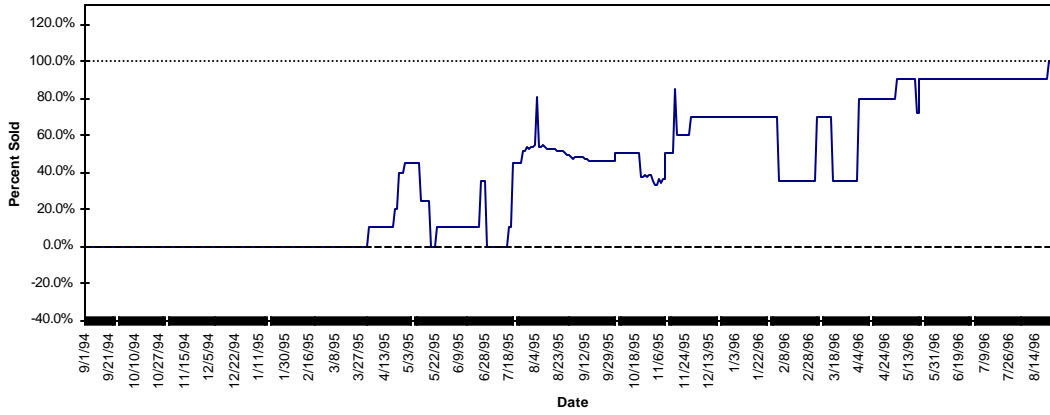
Figure 15. Grain Field Marketing Profile, Corn, 1995.
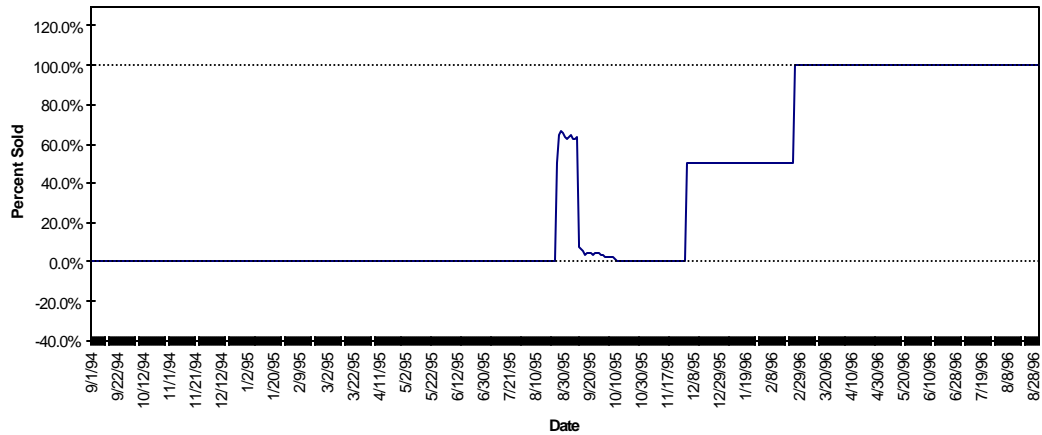
Figure 16. Harris Elliot Marketing Profile, Corn, 1995.

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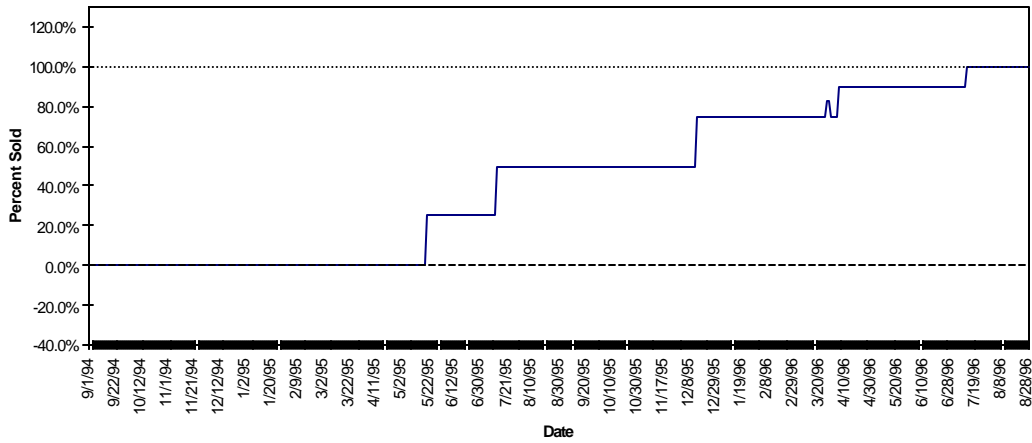
Figure 17. Hjort Marketing Profile, Corn, 1995.
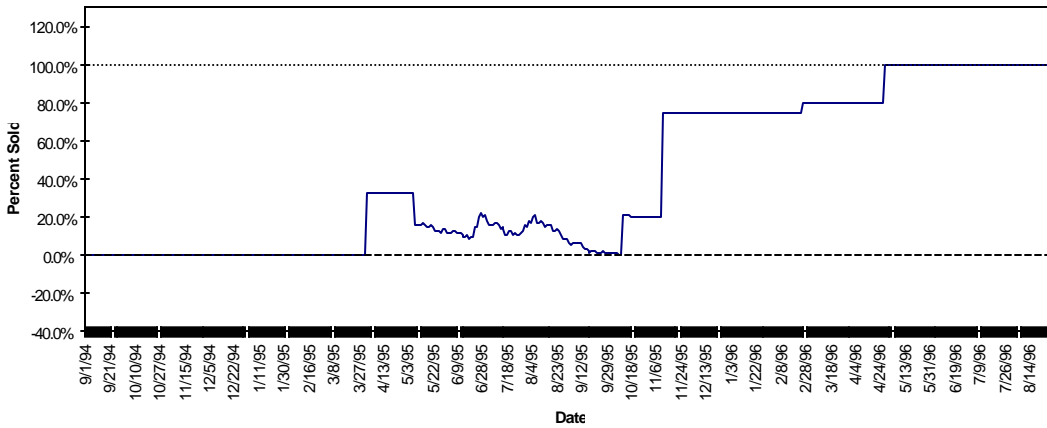
Figure 18. North American Ag Marketing Profile, Corn, 1995.

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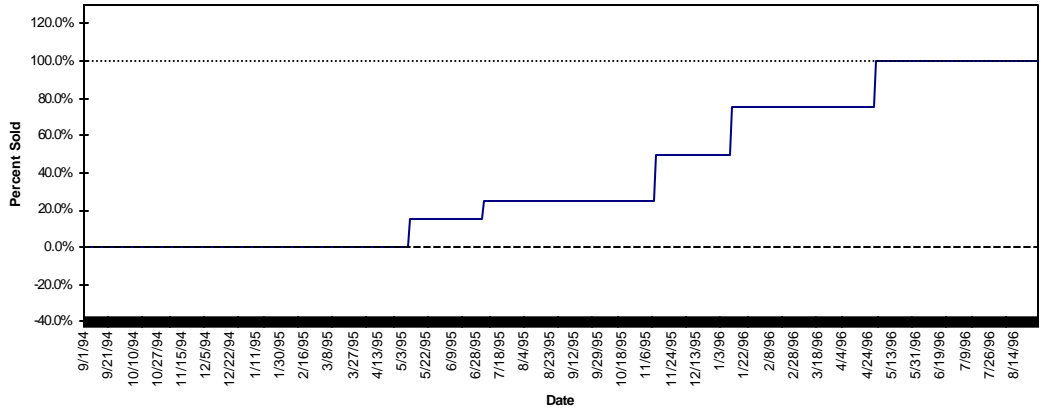
Figure 19. Pro Farmer Strictly Cash Marketing Profile, Corn, 1995.
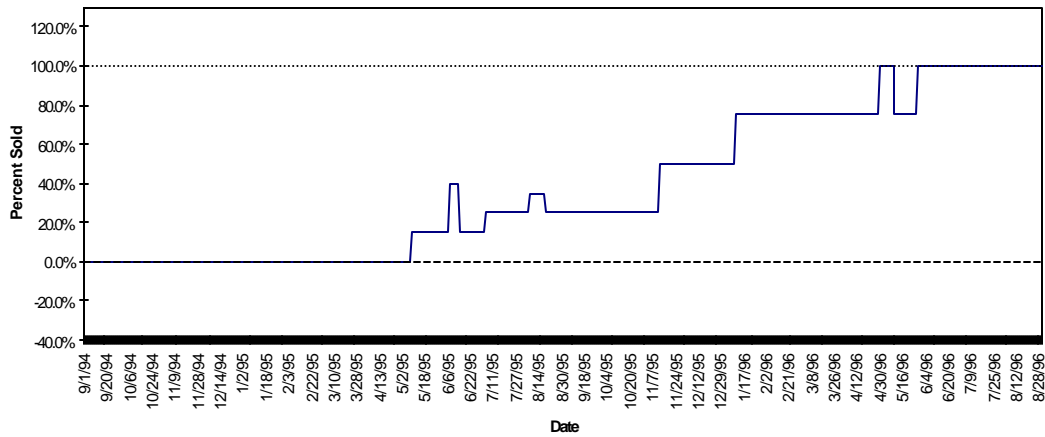
Figure 20. Pro Farmer Hedging Strategy Marketing Profile, Corn, 1995.

Note: Scale in this graph is different and smaller (220% on Y axis)
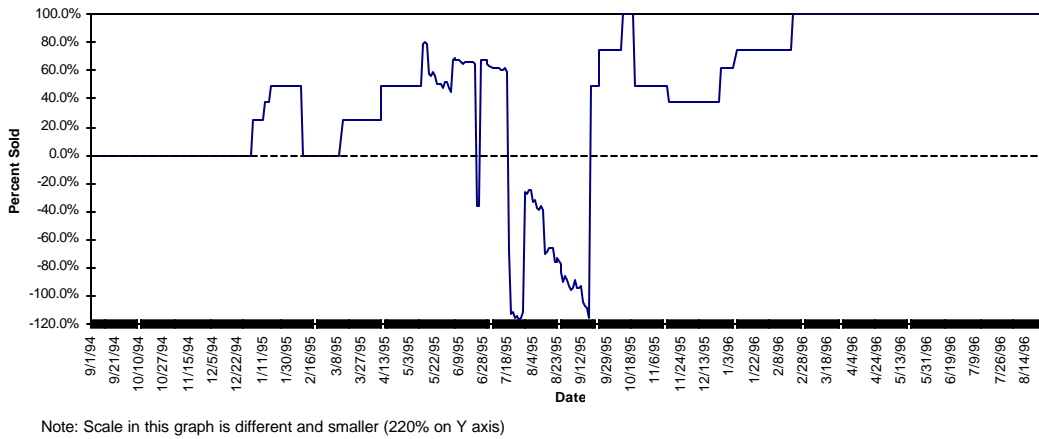
Figure 21. Prosperous Farmer Marketing Profile, Corn, 1995.
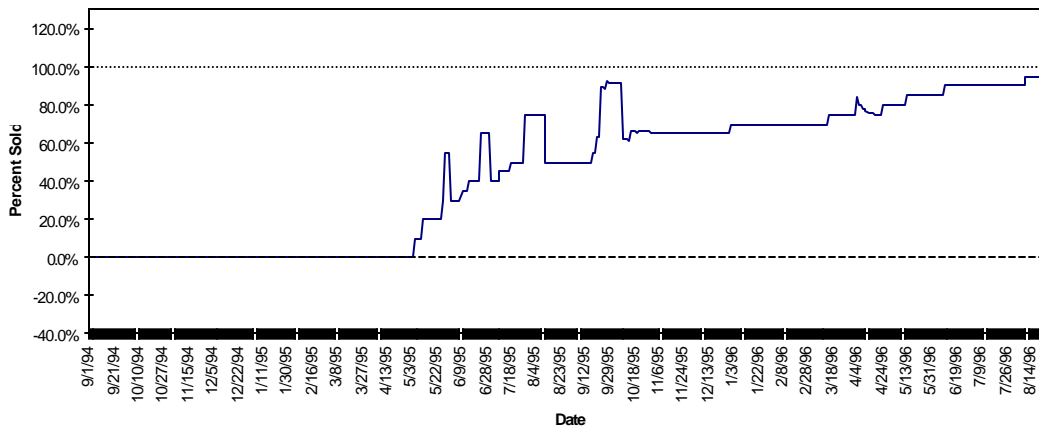
Figure 22. Stewart Peterson Marketing Profile, Corn, 1995.
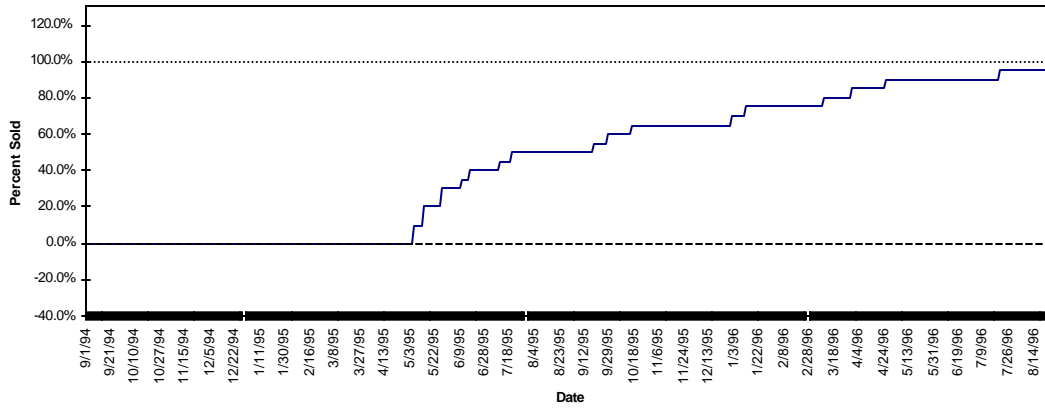
Figure 23. Stewart Peterson Strictly Cash Marketing Profile, Corn, 1995.
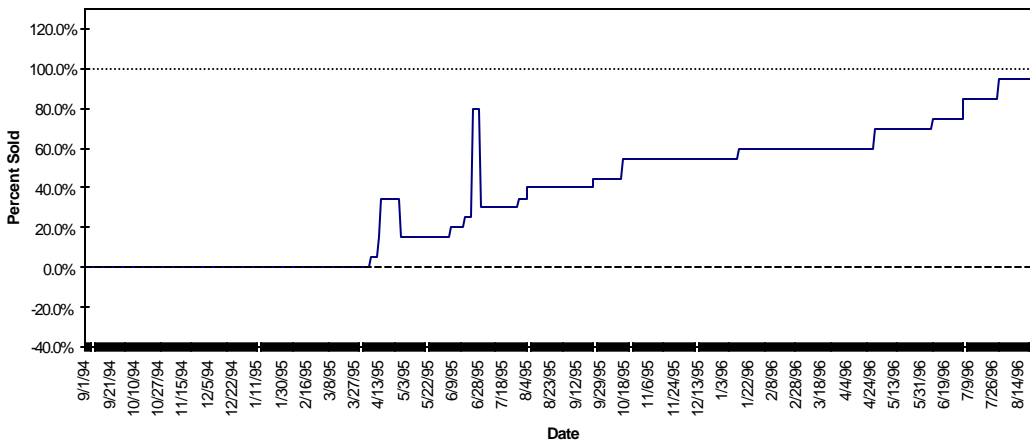
Figure 24. Top Farmer Marketing Profile, Corn, 1995.
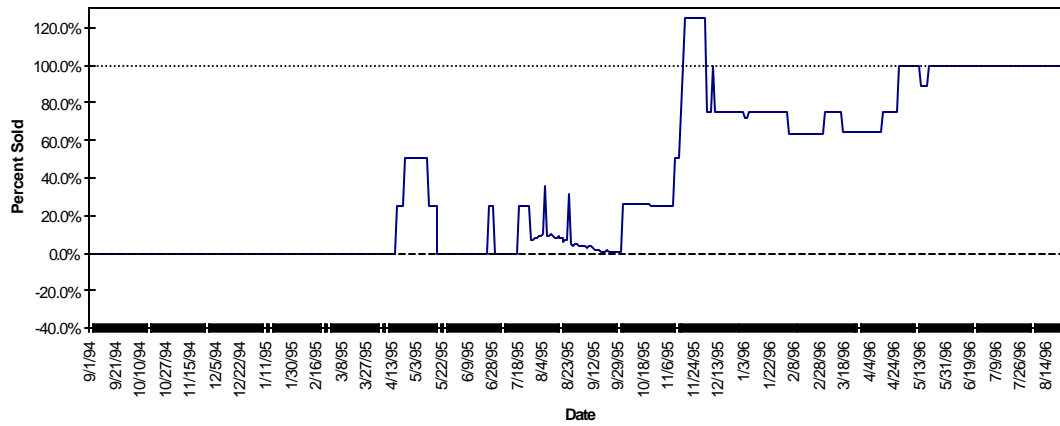
Figure 25. Zwicker Marketing Profile, Corn, 1995.
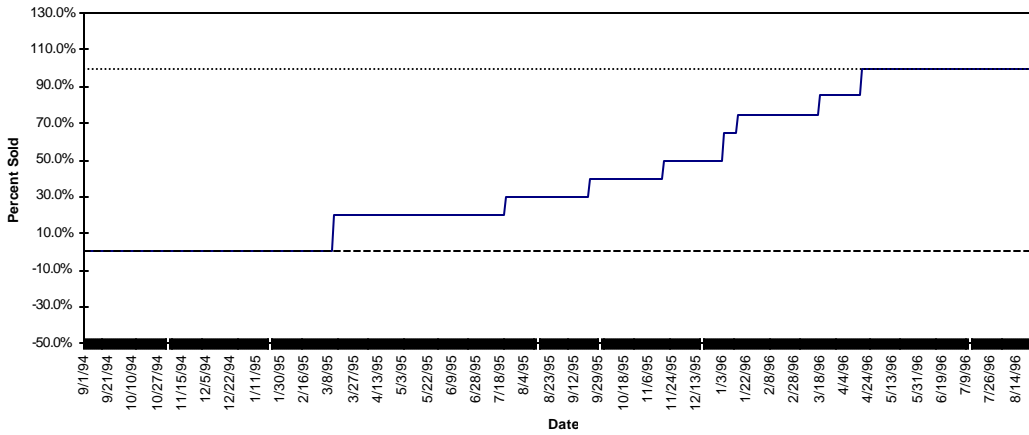
Figure 26. Ag Line Marketing Profile, Soybeans, 1995.
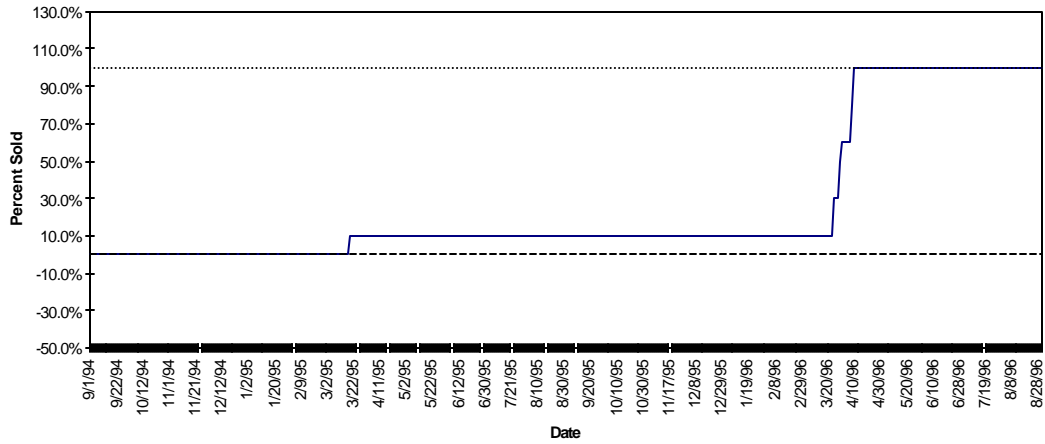
Figure 27. Ag Resource Marketing Profile, Soybeans, 1995.
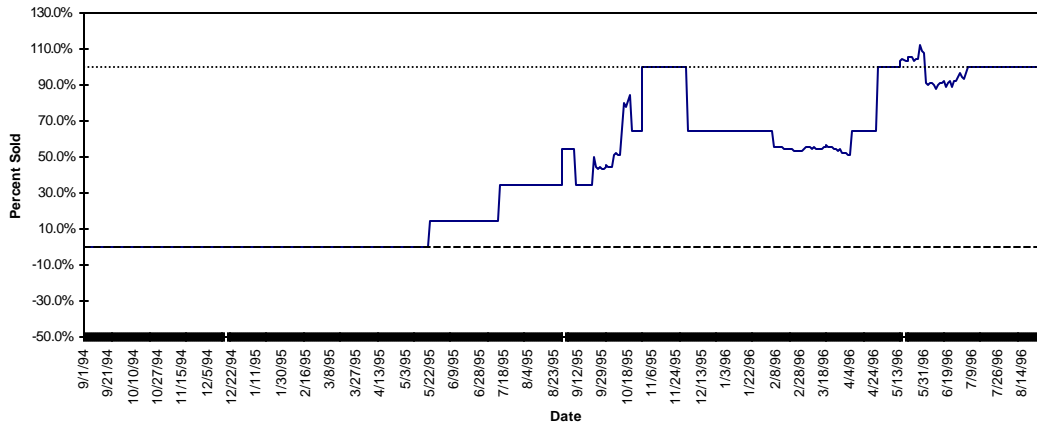
Figure 28. Ag Review Marketing Profile, Soybeans, 1995.
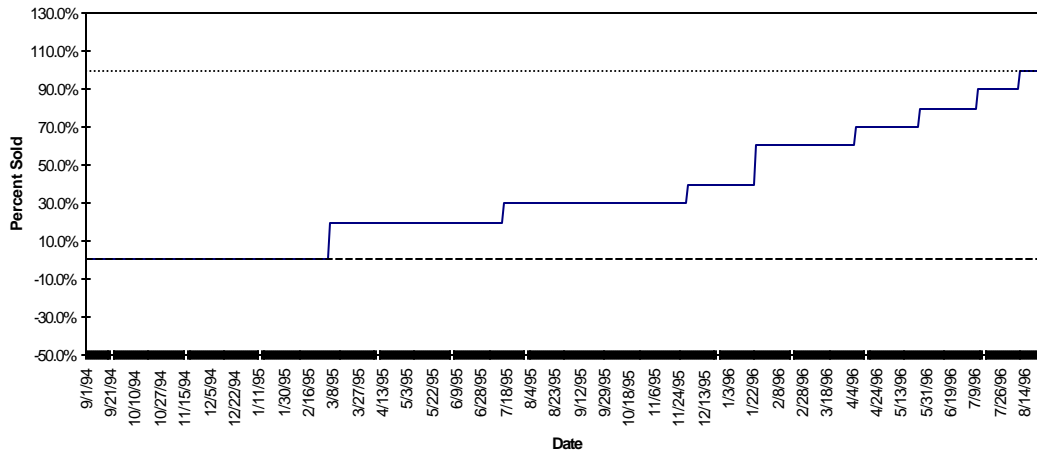
Figure 29. Agri Edge Cash Only Marketing Profile, Soybeans, 1995.
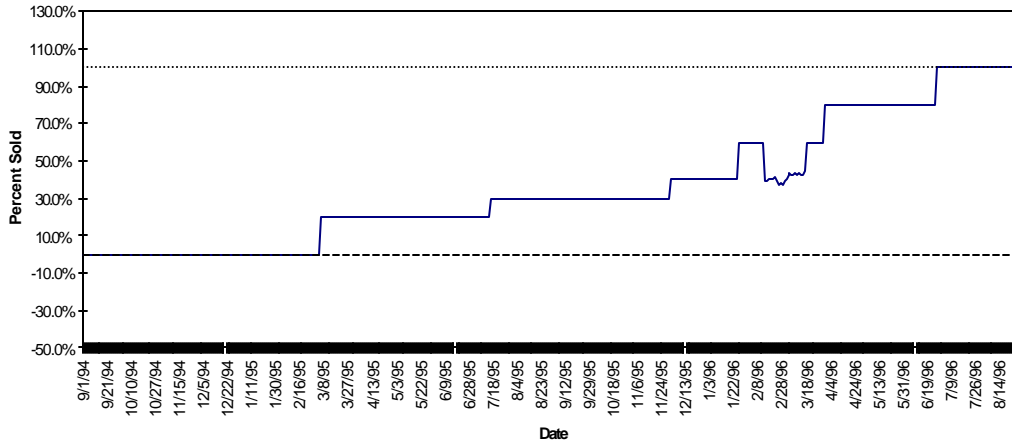
Figure 30. Agri Edge Hedge Marketing Profile, Soybeans, 1995.
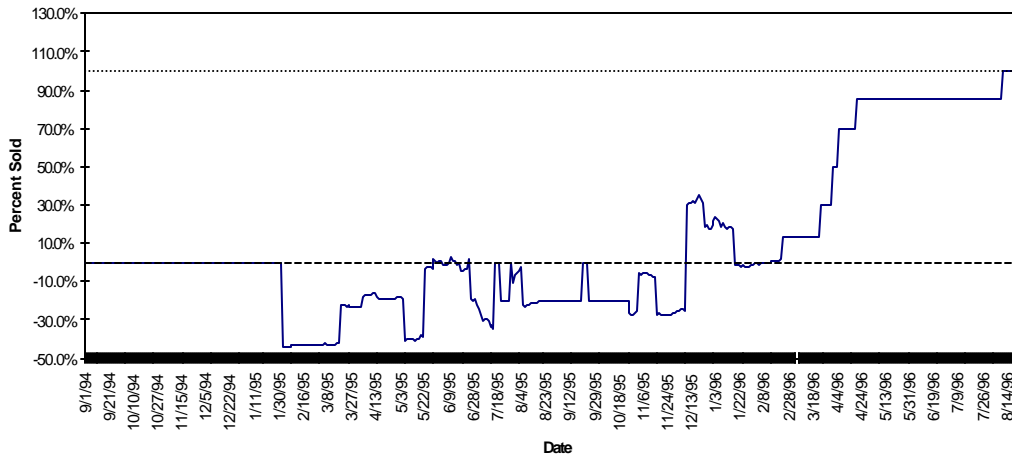
Figure 31. Agri Mark Marketing Profile, Soybeans, 1995.

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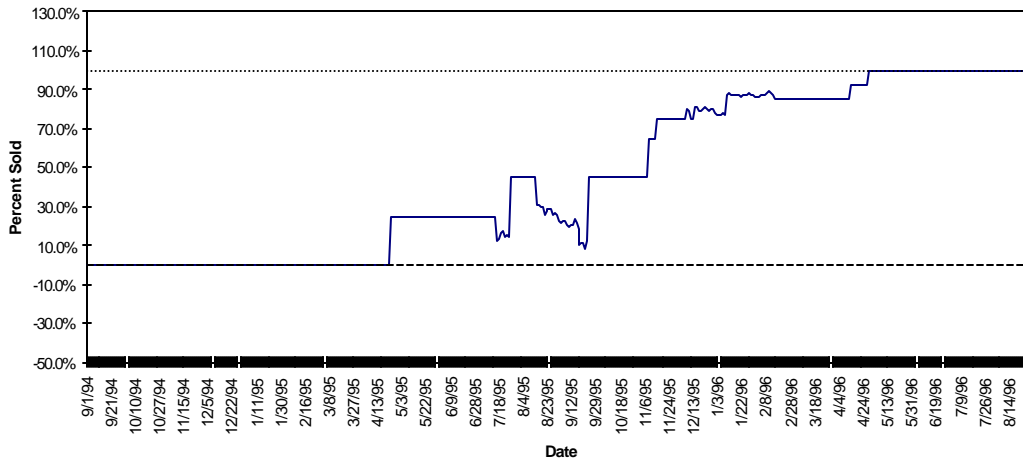
Figure 32. Agri Visor Aggressive Cash Marketing Profile, Soybeans, 1995.

Figure 33. Agri Visor Aggressive Hedge Marketing Profile, Soybeans, 1995.

Figure 34. Agri Visor Basic Cash Marketing Profile, Soybeans, 1995.

Figure 35. Agri Visor Basic Hedge Marketing Profile, Soybeans, 1995.
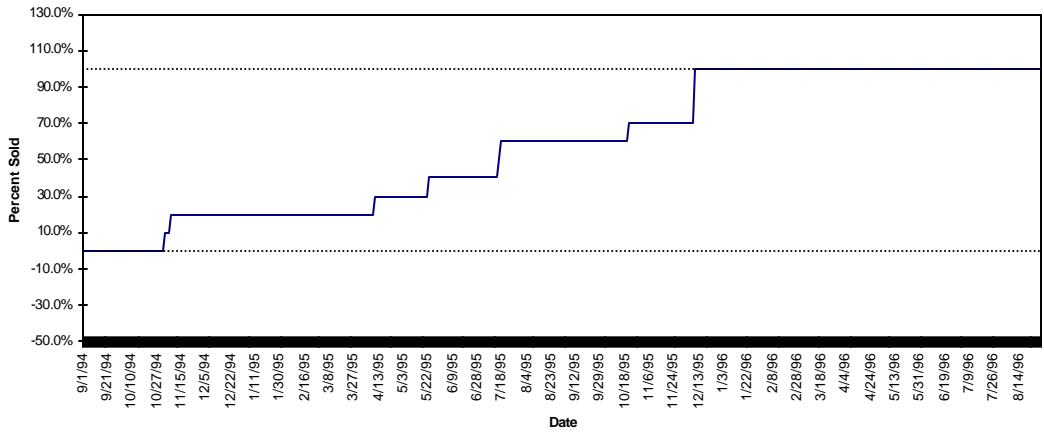
Figure 36. Allendale Marketing Profile, Soybeans, 1995.
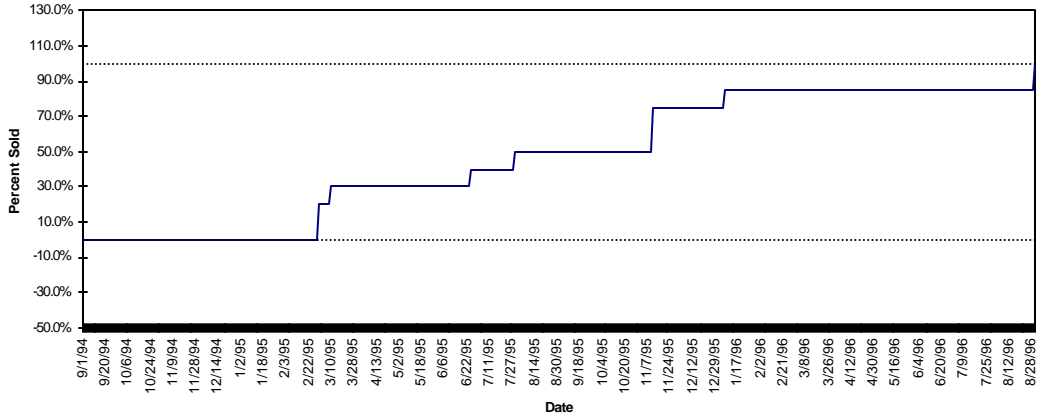
Figure 37. Brock Cash Only Marketing Profile, Soybeans, 1995.
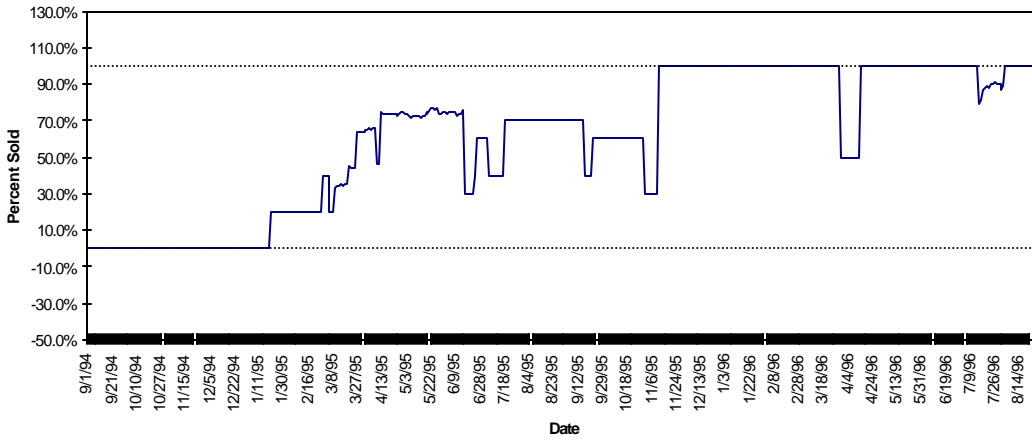
Figure 38. Brock Hedge Marketing Profile, Soybeanss, 1995.

Figure 39. Freese Notis Marketing Profile, Soybeans, 1995.
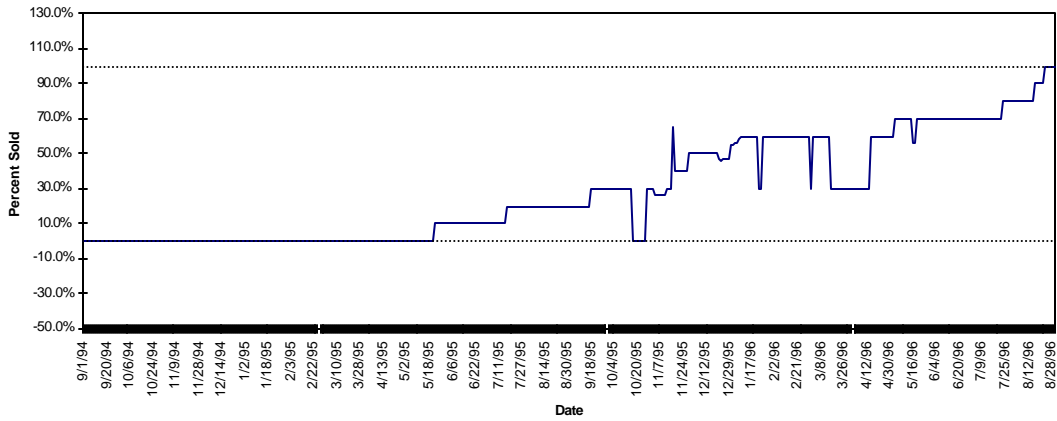
Figure 40. Grain Field Marketing Profile, Soybeans, 1995.
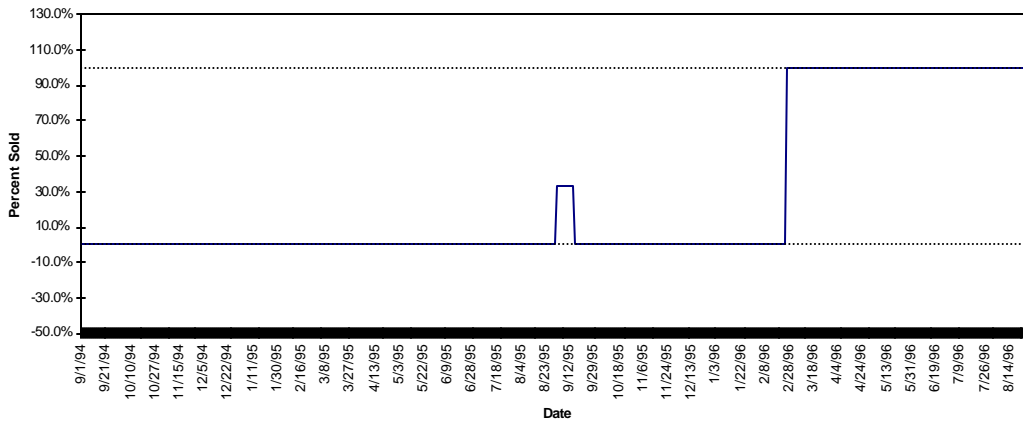
Figure 41. Harris Elliot Marketing Profile, Soybeans, 1995.
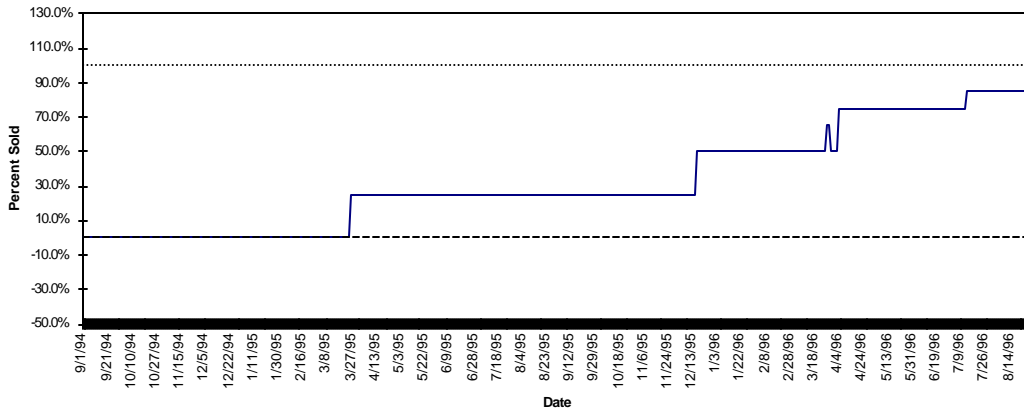
Figure 42. Hjort Ag Profit Marketing Profile, Soybeans, 1995.
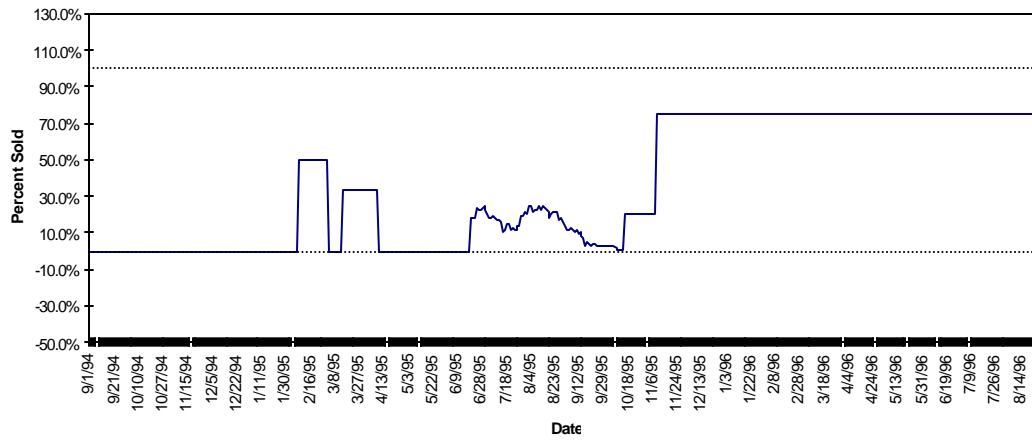
Figure 43. North American Ag Marketing Profile, Soybeans, 1995.
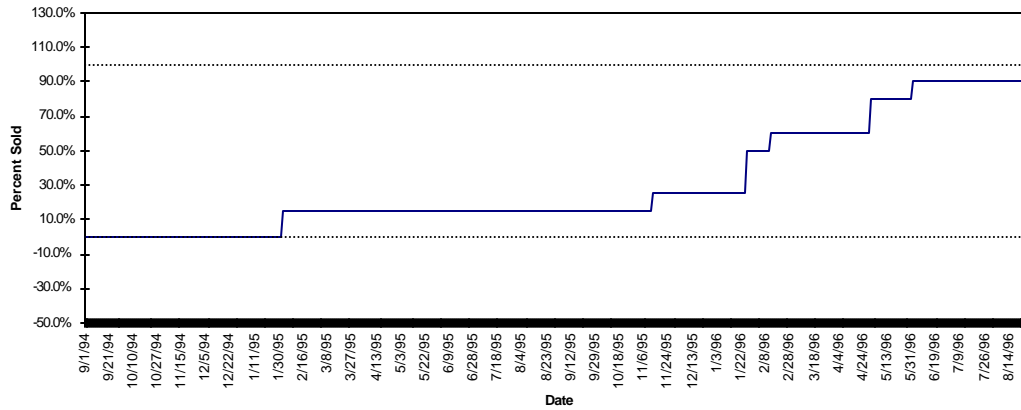
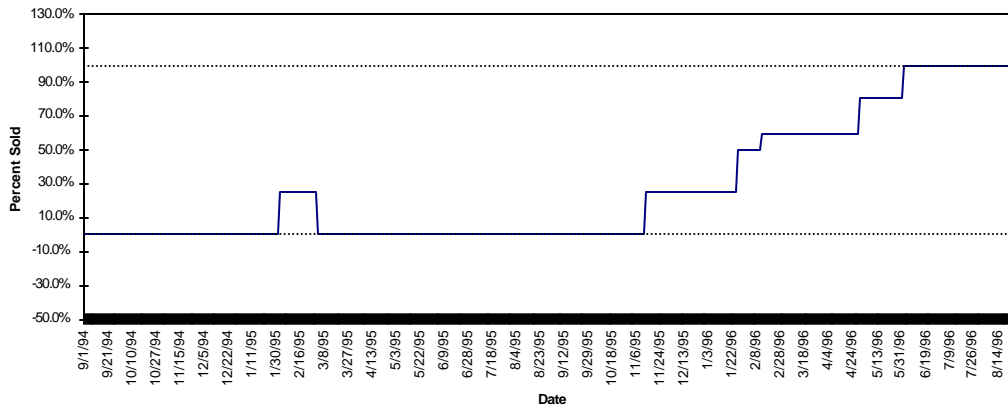**Figure 44. Pro Farmer Cash Only Marketing Profile, Soybeans, 1995.**

Figure 45. Pro Farmer Hedge Marketing Profile, Soybeans, 1995.
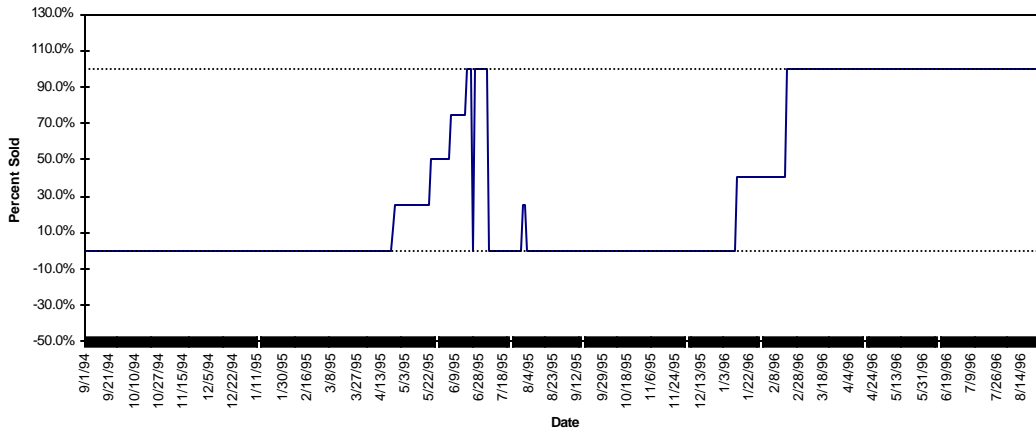
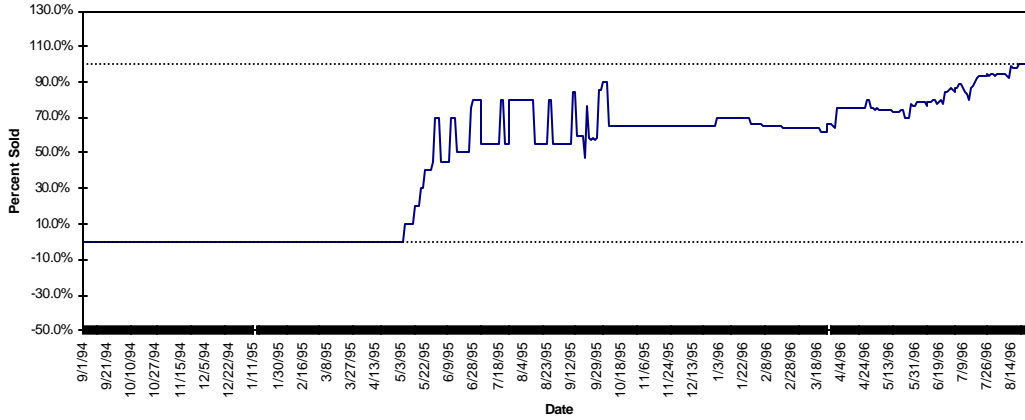**Figure 46. Prosperous Farmer Marketing Profile, Soybeans, 1995.**

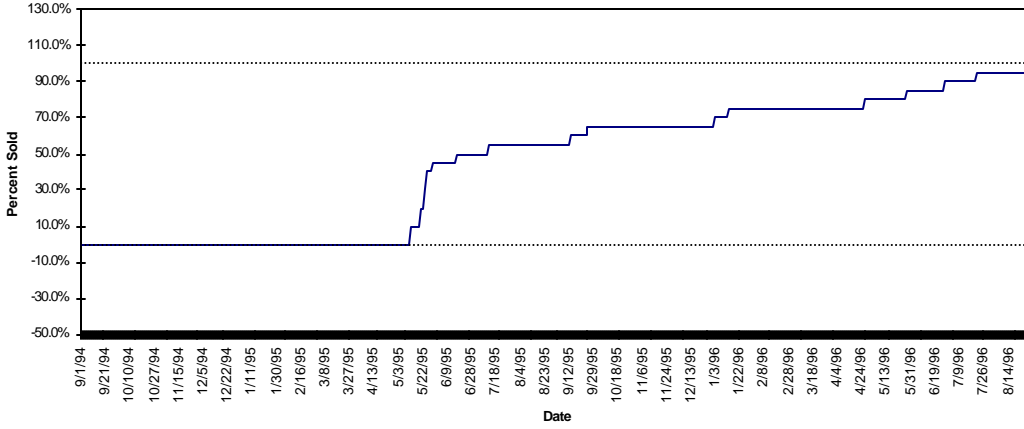**Figure 47. Stewart Peterson Marketing Profile, Soybeans, 1995.**

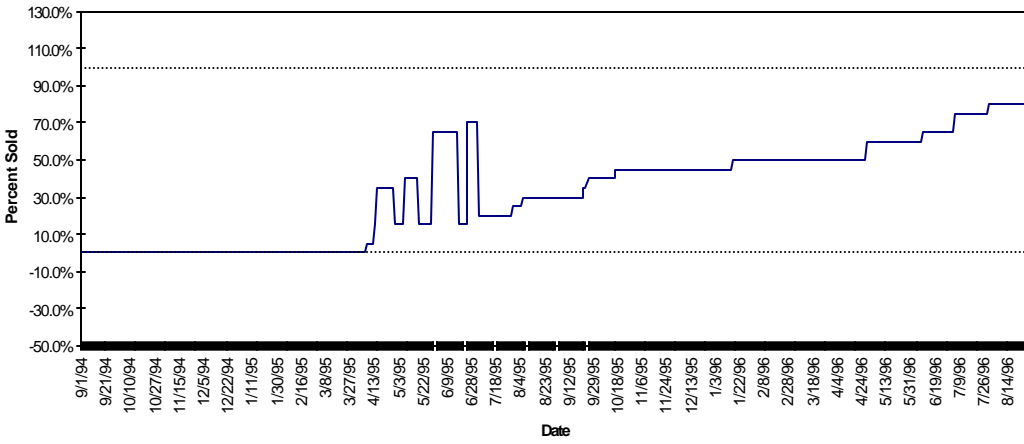**Figure 48. Stewart Peterson Strictly Cash Marketing Profile, Soybeans, 1995.**

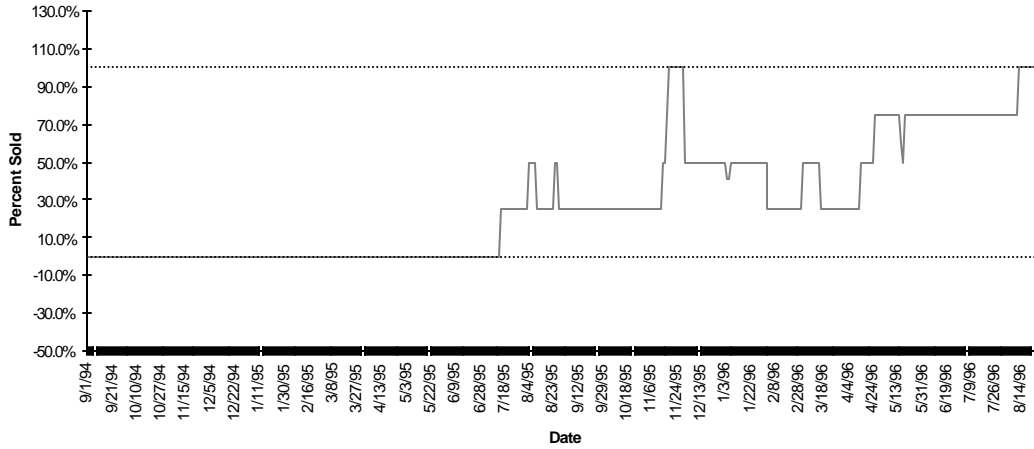**Figure 49. Top Farmer Marketing Profile, Soybeans, 1995.**

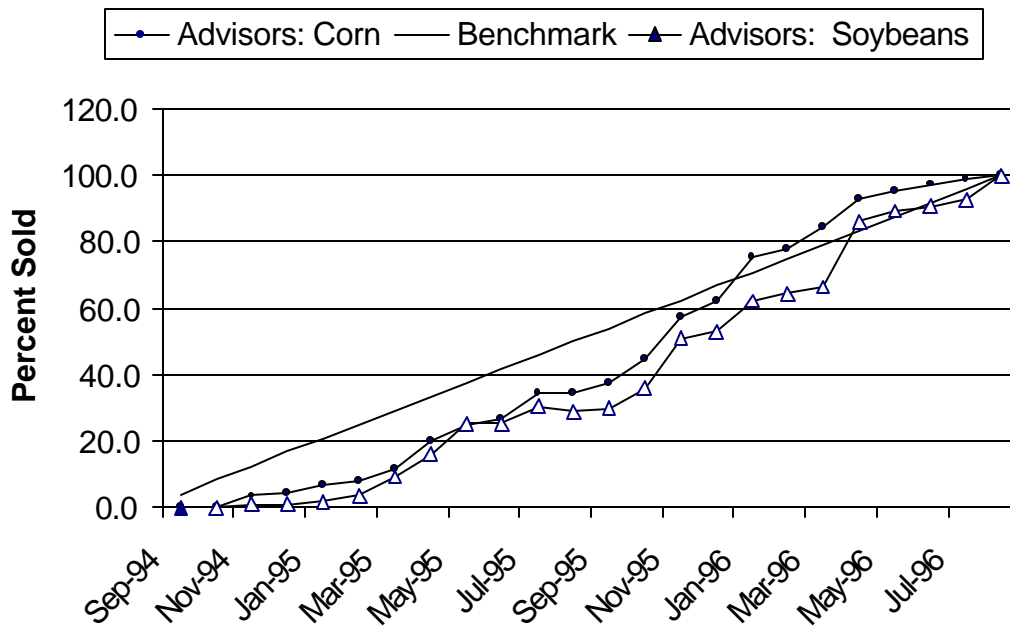**Figure 50. Zwicker Marketing Profile, Soybeans, 1995.**

Figure 51. Comparison of Average End-of-Month Net Amount Sold for Market Advisory Programs and Benchmark Strategy of Selling Equal Amounts Each Month, Corn and Soybeans, 1995.

Technical Appendix

The purpose of this appendix is to provide the technical details of the calculation of: 1) option deltas and 2) the net amount sold when cross-hedging is recommended between corn and soybeans.

Options Deltas

The first step in computing option deltas is to compute the theoretical option value. Following previous academic studies and standard practice by options traders (e.g.,. Natenburg, 1994), Black's model is used,

$$(2) \qquad C = Ue^{-rt}N(h) - Ee^{-rt}N(h - v\sqrt{t})$$

$$(3) \qquad P = -Ue^{-rt}N(-h) + Ee^{-rt}N(v\sqrt{t} - h)$$

where $h = \dfrac{\ln(U/E)}{v\sqrt{t}} + \dfrac{v\sqrt{t}}{2}$, C is the theoretical value of a call, P is the theoretical value of a put, U is the price of the underlying futures contract, E is the option's exercise price, t is the time to expiration as a proportion of a year, v is the annualized volatility in percent, r is the annual risk free interest rate, e is the exponential function, ln is the natural logarithm function, and $N(x)$ is the cumulative normal density function.

The option exercise price and time to expiration are obtained from the Chicago Board of Trade. Data on option premia also are obtained from the Chicago Board of Trade. The underlying futures price is collected from the Technical Tools, Inc. database. The risk free interest rate is the three-month Treasury bill rate. This rate is available at The Federal Reserve Bank of St. Louis home page (http://www.stls.frb.org/fred/wkly/dcd90). The volatility input is the implied volatility of the option, based on the quoted option premiums for the day an option position is recommended. This estimate of the volatility should result in an accurate estimate of the "true" option delta. The option delta is calculated by differentiating the call or put formula by the price of the underlying futures contract. Therefore, the formulas used for deriving call and put deltas are,

$$(4) \qquad \Delta_c = \partial C / \partial U = N(h)$$

$$(5) \qquad \Delta_p = \partial P / \partial U = -N(-h)$$

Since time-to-expiration and the underlying futures price change daily, deltas are recomputed each day for the relevant option positions.

Cross-Hedging

A marketing strategy that can be used is to cross-hedge corn sales in the soybean futures and/or options market and *vice versa*. Two cross-commodity recommendations were made by Zwicker during the 1995 marketing window. One involved cross-hedging corn in the November 1995 soybean futures contract. This recommendation was placed on March 15, 1996 and offset on April 16, 1996. The second involved buying corn via a long May 1996 soybeans call. This recommendation was initiated on January 4, 1996 and closed out on January 8, 1996.

When a cross-hedge exists, calculation of the aggregate amount sold is made as follows,

$$(6) \qquad \Delta_t = \sum_{i=1}^{n} \boldsymbol{w}_{it}\Delta_{it} + \sum_{j=1}^{k} \boldsymbol{w}_{jt}\Delta_{jt}\boldsymbol{b}_{jt}$$

where Δ_t is the aggregate amount sold on day t, $\boldsymbol{w}_{it}$ and $\boldsymbol{w}_{jt}$ are the amount sold on individual transactions of commodity i (corn) and j (soybean cross-hedging of corn) on day t, Δ_{it} is the delta weight on each individual corn transaction on day t, Δ_{jt} is the delta weight on each individual soybean transaction on day t, and $\boldsymbol{b}_{jt}$ is the change in soybean prices for a one percent change in corn prices on day t. The relationship between soybean and corn future prices ($\boldsymbol{b}_{jt}$) is estimated by running a simple ordinary least square regression of the natural logarithm of soybean futures contract prices against the natural logarithm of corn futures contract prices. This regression equation is estimated for each day the cross-hedging position is open. The first observation in the regression data set is the day that both contracts are first traded. The last observation in the data set is the current date the recommendation is open. Each day that the cross-marketing position is recommended the data series is extended by one day and the regression equation is re-estimated. Because the double-log functional form is used, the estimated slope parameter can be interpreted as the percent change in soybean futures price for a one percent change in the corn futures price.

To illustrate the calculation of the aggregate amount sold when cross-hedging is involved, assume an advisory service previously has recommended selling 20 percent of the corn crop via cash forward corn contracts and now recommends taking a long soybean call position on 12.5 percent ($\boldsymbol{w}_{jt}$) of corn production. Assume the delta for this soybean long call with soybeans futures (Δ_{jt}) is –0.37 (obtained from equation 4) and the estimated slope coefficient between corn and soybean futures prices ($\boldsymbol{b}_{jt}$) is 0.61. Substituting these values into equation (6) yields an aggregate amount sold of 17.2 percent [0.20 +(-0.37 x 0.61 x 0.125)].