# Style and Performance of Agricultural Market Advisory Services

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**Style and Performance of Agricultural Market Advisory Services**

*This paper describes the degree of marketing activeness of market advisory programs for corn and soybeans, and analyzes the relationship between activeness degree and pricing performance. The data set employed consists of advisory programs tracked by the AgMAS Project at the University of Illinois between 1995 and 2001. Cluster analysis was conducted to group the programs according to their degree of activeness. Panel data regression models were estimated to evaluate the relationship between activeness degree and pricing performance. In the corn market, point estimates indicate a positive effect of the degree of activeness on pricing performance, but this effect is of small magnitude and statistically insignificant. For soybeans, there is a stronger positive relationship between activeness degree and performance, with an estimated effect of activeness on performance larger in magnitude and statistically significant. This positive relationship suggests that active marketing programs are based on superior information and/or analytical skills.*

**Key words:** agricultural market advisors, marketing activeness, pricing performance, corn, soybeans

## Introduction

Marketing decisions are an important part of farm business management. Farmers are interested in enhancing farm income and reducing income variability when marketing crops. There are many tools to assist farmers in such marketing decisions. Several surveys, including Patrick et al. (1998) and Norvell and Lattz (1999), report that farmers specifically view one of these tools, professional market advisory services, as an important source of marketing information and advice. For a subscription fee, advisory services provide market information and specific recommendations on marketing transactions.[1] For example, a service may recommend selling 50% of expected production today at $2/bu. using December corn futures. It is often argued that advisory services can process market information more rapidly and efficiently than farmers to determine appropriate marketing decisions.

In 1994, the Agricultural Market Advisory Service (AgMAS) Project was initiated at the University of Illinois with the goal of providing rigorous evaluation of advisory services' performance. In the most recent AgMAS publication, Irwin et al. (2005) present results from the evaluation of advisory services in corn and soybeans over 1995-2003. On average, the price obtained following the recommendations of market advisors is higher than the average price offered by the market for both crops. This price difference is small and statistically insignificant for corn and larger and significant for soybeans. When comparing advisory prices to the price obtained by farmers, results show that, on average, the advisory price exceeds this benchmark by a significant amount in corn. In contrast, the average advisory price is lower than the average price received by farmers in soybeans, but this difference is not significant. The authors conclude that there is only weak evidence supporting the success of advisory services in outperforming external benchmarks. Similar conclusions are obtained from analyzing the proportion of programs above benchmarks. Additionally, results from predictability tests suggest that

[1] See Isengildina et al. (2004) for a discussion of the structure and history of market advisory services in US agriculture.

individual past performance has little power to predict future performance. However, extreme performance appears to be more predictable, in particular for longer horizons.

The main goal of previous research was to analyze the performance of advisory services as a group and less attention was given to differences in performance across services. In this context, an important unanswered question is whether there are unique characteristics of services that can be used to predict future performance. Moreover, AgMAS results show wide cross-sectional differences in the performance of services. For example, in 2001, the difference between the maximum and minimum price obtained was $0.87/bu. for corn and $0.93/bu. for soybeans, which represents a substantial proportion of the average prices for that year, $1.99/bu. for corn and $5.44/bu. for soybeans. This evidence suggests that there are substantial economic rewards if performance can be predicted.

Also, it is evident from the set of recommended transactions delivered by advisory services that there are notable differences in marketing style. In particular, it is clear that services have very different degrees of marketing "activeness." For instance, while some of them recommend only four or five cash sales uniformly spread along the marketing window, others recommend multiple futures and options transactions and take extreme long and short positions in the market (Colino et al., 2004a, 2004b; Martines-Filho et al., 2003a, 2003b).[2] Pennings et al. (2004) show that the nature of the recommendations made by advisory services is an important factor in the way farmers evaluate services. Therefore, the information about the style of different programs should be of considerable interest for farmers.

Style information is also useful for farmers seeking to reduce price risk by diversifying across advisory services. In this case, higher risk reduction benefits may be obtained by choosing services with different styles. This is relevant because, according to survey results (Isengildina et al., 2004), farmers that subscribe to advisory services often subscribe to several of them. Moreover, in recent years many grain companies began to offer contracts where grain is priced according to the recommendations of several advisory services. These new marketing tools may make it very simple for farmers to diversify by combining contracts for different advisory services.

The observed cross-sectional differences in style and performance lead naturally to the question of whether style is related to the ability of the services to outperform benchmarks. Concepts from market efficiency (Fama, 1970) and behavioral finance (Odean, 1999) theory provide a framework to analyze the relationship between marketing activeness and price performance. A rational agent who has little private information and is without superior skills to analyze public information will implement a naive strategy for selling crops consisting of a few cash sales spread along the marketing window. On the other hand, market advisors will deviate more from such a "conservative" strategy and engage in more "active trading" when they believe that they are able to forecast price changes. Based on the market efficiency concept, only those advisory services that have relevant private information or are able to build superior models to analyze public information can expect to be able to predict future price movements and profit from an active marketing strategy. However, behavioral theories suggest that market advisors may believe that they have better price forecasting skills than they actually posses and recommend highly active strategies even when they don't have superior information. This argument is based on the notion from cognitive psychology that in most cases people are

[2] Short refers to a "sell" position in the market. Long refers to a "buy" position in the market.

overconfident in the judgment of their ability to make predictions (Fischhoff et al., 1977). Since highly active strategies are generally more expensive in terms of brokerage fees, the degree of activeness would be negatively related to price performance when active programs are designed by overconfident advisors. On the other hand, a positive relationship between activeness and performance would suggest that active programs are based on superior information and/or analytical skills.

The main goal of this research is to answer the question of whether market advisory programs characterized by more active marketing styles exhibit superior performance. Specifically, this study evaluates advisory services tracked by the AgMAS Project for the 1995 through 2001 corn and soybeans crops. Five variables that measure the degree of activeness are computed for each program in each crop year based on the set of recommendations delivered by the services. Then, using a clustering method, advisory services are separated into three style groups: conservative, active and very active. Finally, the relation between style and pricing performance is evaluated using a panel data regression model.

## Previous Research

There are many studies in the finance literature that consider active versus passive management, with most studies analyzing trading behavior in the stock market. In this case, a passive investment strategy would be to always hold every security from the market in the same proportion as the fraction of market value that this security represents. Then, active investors are those who hold securities in other than the benchmark weights (Sharpe, 1991). Active management in this context is a zero-sum game, since all active managers together should hold exactly the market portfolio. However, there is the possibility for a skilled manager, trading based on superior information, to beat the market at the expense of the others (Waring and Siegel, 2003).

Recent research in behavioral finance has suggested that active trading may be related to investors being overconfident with respect to their forecasting ability. Odean (1998) developed a theoretical model to analyze what happens at the market level when traders are overconfident. He concludes that overconfidence increases heterogeneity in investors' beliefs and consequently increases trading volume. In his view, overconfidence contributes to the excessively high volume traded in financial markets today. Odean suggests that active managers may be overconfident in their ability to beat the market and spend too much time and money trying to do so. Barber and Odean (2000) investigated individual investors' trading decisions and they found that more active trading was associated with lower profits. This finding is consistent with investors making trading decisions based on overconfident judgments.

A recent study that considered a similar problem in the grain marketing area was conducted by Cunningham et al. (2004), who analyzed the relationship between the degree of activeness and the price obtained by wheat farmers. The measure of activeness that these authors employed is the variability in the average storage period between years. They concluded that the activeness level has no effect on price performance.

The results from the last two papers mentioned are consistent with the market efficiency hypothesis. Since individual farmers, or individual households, have neither access to new information before the rest of the market participants nor have superior ability to analyze

information, they should not be expected to be able to predict future price changes.[3] However, it is possible that this is not the case for at least some professional market advisors, who may invest in collecting and analyzing new information and engage in active trading based on their market research. This possibility is the focus of the current study, which analyzes the relationship between the degree of activeness of agricultural market advisory services and performance.

## Data

The sample for this study consists of a subset of the advisory programs that were evaluated by the AgMAS Project from 1995 to 2001.[4] The term "advisory program" is used because several advisory services have more than one distinct marketing program. When it was first launched, AgMAS monitored and evaluated a sample of 25 advisory programs, including the most popular among Midwest farmers. Additions and deletions to this original sample occurred for a variety of reasons, resulting in a group of between 23 and 27 programs in each crop year. For this study a subgroup of 21 programs is selected. These programs were included in at least five of the seven crop years between 1995 and 2001 (Table 1). Two of these programs, AgLine by Doane (hedge) and Allendale (futures only), are only considered for the corn market. The first one started giving recommendations for soybeans in 1998, so it does not meet the requirement of having at least five time-series observations. The second program exists only for the corn market.

The data employed in this research consist of advisory prices and the transactions recommended by advisory services for corn and soybeans. The advisory price is the price received by a farmer who markets the crop according to the advisory program's recommendations, net of storage and brokerage costs. The prices employed in this study can be found in Irwin et al. (2003). A complete list of transactions recommended by the advisory programs is available through AgMAS records. The AgMAS Project receives and saves the advisors' marketing recommendations from e-mails or companies' websites in real-time. This procedure ensures that all recommendations are recorded with the exact time when they were delivered. The benchmark price employed for comparison in this study is also obtained from AgMAS publications. This market benchmark is the average price offered by the market in a 20-month marketing window starting in January of the harvest year and finishing one year after harvest, net of storage costs. Complete details on the construction of advisory prices and the benchmark can be found in Irwin et al. (2003).[5]

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[3] It is possible that some of the farmers in the Cunningham and Brorsen's sample determined market timing based on market advisory service recommendations.

[4] The AgMAS Project recently published corn and soybeans pricing results for the 1995 to 2003 crop years (Irwin et al., 2005). However, the data set for computing activeness measures for 2002 and 2003 is not available at the present time.

[5] The AgMAS project employs two different market benchmarks in the evaluation of market advisory services, a 20-month market benchmark, which is the one employed in the current study and a 24-month market benchmark. Both benchmarks represent the average price offered by the market along the marketing window, but for the 24-month benchmark the marketing window starts one year before harvest (4 months earlier than the 20-month benchmark). Results using the other benchmark will be computed in later versions of this study, but should be similar to the ones presented here.

## Pricing Performance

The primary measure of advisory program performance is the difference between the price received by a farmer who markets grain following a service's recommendations and the market benchmark. The following discussion provides a brief overview of pricing performance results obtained by the AgMAS Project for the 1995 through 2001 crop years. A complete report of the most recent pricing evaluation can be found in Irwin et al. (2005).

Figure 1 shows information about the performance of the advisory programs in corn and soybean markets. The vertical axis is the difference between the advisory price and the benchmark price. Note that there is a great dispersion across services, considering that the average benchmark prices for corn and soybeans in the period 1995-2001 are $2.29/bu. and $5.91/bu., respectively. Note, also that advisory programs appear to be more successful in soybeans than in corn. The average proportion of programs outperforming the benchmark was 60% for corn and 74% for soybeans.

Panels A and B in Figure 2 present the mean advisory price versus standard deviation for corn and soybeans, respectively. The figures show those programs that are included in the AgMAS sample for all years between 1997 and 2001, with means and standard deviations for this period. The labels correspond to the program's ID numbers as presented in Table 1. In the figures, the points located northwest from the market benchmark are risk dominant in the mean-variance sense, since they have greater expected price and lower risk. Note that very few programs dominate the market benchmark for corn and a moderate fraction dominate the market benchmark for soybeans, suggesting, as in Figure 1, that programs are more successful in the soybean market than in the corn market.

## Marketing Activeness Degree

An important issue in this study is how to measure the activeness degree of advisory programs. In the finance literature, Odean and collaborators (e.g. 1998, 1999), who have conducted extensive research on investors' trading behavior, measured the degree of activeness based on traded volume. Specifically, they employed the average of sales and purchase turnover as the measure of activeness. Purchase turnover for a given period is computed as the number of shares purchased times the price per share divided by the value of the total portfolio. In the same way, sales turnover is computed as the number of shares sold times the price per share divided by the value of the total portfolio. Similar measures of trading volume are considered for defining the activeness degree of advisory programs in the current study.

As mentioned earlier, a recent study (Cunningham et al., 2004) analyzes the activeness degree of marketing strategies implemented by wheat farmers. In this research the activeness level is measured as the variability in the storage period across marketing years. The underlying idea for this measure is that the seasonal timing of sales will be more variable from year- to-year when sales are decided by a farmer who believes that he/she can forecast future price moments. On the other hand, farmers who don't intend to forecast price movements will implement a similar pattern in crop sales across years. In Cunningham et al.'s study only cash sales are considered, since data on forward and derivatives transactions were not available. The authors indicate that the most relevant marketing transactions to consider for evaluating marketing

behavior are the cash sales, since the use of forward contracts and derivatives by the farmers included in their study was extremely small.

There has been no formal study analyzing the marketing style of agricultural advisory services. However, an article published in the *Marketing* section of *Top Producer* magazine (a publication for US farmers) provides useful information about how market participants and observers evaluate the marketing style of advisory services (Williams, 2001). This article describes the marketing styles of a group of the most popular market advisors. According to this publication, a program can be considered conservative if sales are made in small increments, spread over the marketing season. Also, conservative advisors generally recommend a sell-and-hold strategy rather than being in and out the market several times along the marketing period. On the other hand, some behaviors related to a more aggressive marketing style are selling large proportions of the crop in one transaction, frequently reversing positions and trading production several times a year. These ideas are employed in the current study to define marketing activeness of advisory programs.

Previous research provides some notions for measuring of activeness degree of agricultural advisory programs. However, activeness measures employed by other researchers in different contexts can not be directly applied in the current study. One possibility would be to separate programs that are restricted to cash transactions (according to their names) from programs without this restriction. However, this classification does not appear to be meaningful since some of the cash only programs recommend futures and options positions in some of the crop years, and some programs without restrictions rarely recommend futures and options positions. Hence an alternative criteria for activeness measurement needs to be developed. A useful starting point for assessing an advisory program's activeness is the *marketing profile* for that program. The marketing profile for a given crop year is constructed by plotting the cumulative net amount priced, as percentage of total production, during the marketing season. Examples of marketing profiles are presented in Figures 3 and 4.

To construct a marketing profile it is necessary to combine the proportion of crop priced under different marketing tools. The computation of the percentage of the crop priced from cash, forward contract or futures positions is straightforward. The percentage of the crop sold under cash, forward contracts or short futures can be added to compute the total percentage priced. Likewise, the percentage of grain owned under long futures positions is subtracted. For example, on a given pre-harvest day, assume that since the beginning of the crop year a service has recommended selling futures for 30% of expected production, cash forward contracting another 20% and, later, buying futures for 10% of the expected production. The value of the index on that day would be 30% + 20% - 10% = 40%. On the other hand, put and call options represent a more complicated situation since they are not straightforward purchases or sales of grain. In this case, the option delta is employed to convert an option position into an equivalent position, in terms of price sensitivity, in the underlying futures market. [6] For example, if a program recommends buying at-the-money puts for 30% of production and the delta for that put option is 0.5, then the position is equivalent in terms of price sensitivity to selling futures for 15% of production. Deltas employed in the construction of the marketing profiles are updated on a daily basis and these results in irregular patterns in marketing profile lines when options positions are open (see Figure 4). Option deltas allow all positions in cash, forward and futures

[6] The delta is the partial derivative of the option price with respect to the price on the underlying asset.

and options markets recommended by a program to be combined into an index of the cumulative percentage of a crop priced for each day in the marketing window. Note that the cumulative amount priced is a measure of within crop year price risk, as the higher the proportion of a crop priced, the lower the sensitivity of the value of the farmer's position to crop price changes. When 100% of the crop is priced there is no price sensitivity, which means that changes in price do not affect the value of the farmer's position. At the other extreme, when the amount priced is 0%, the value of the farmer's position will vary in the same proportion as the change in price. More details about marketing profiles construction can be found in Martines-Filho et al. (2003a, 2003b) and Colino et al. (2004a, 2004b). Also, in these publications all individual profiles for the programs tracked by AgMAS as well as averages across programs and years are presented.

It is quite intuitive from comparing Figures 3 and 4 to establish that AgLine by Doane (cash) is a more conservative marketing program than Utterback Marketing Services. However, it is not possible to define a unique measure that quantifies the difference in degree of activeness. Instead, the best alternative is to combine several measures that describe different aspects of the activeness level of an advisory program. Five measures are considered relevant in the current study: 1-Sum of changes in amount priced, 2-Total traded volume, 3-Distance between extreme positions, 4-Difference from the benchmark marketing profile, and 5-Variability in the marketing profile.

The sum of changes in amount priced is computed by adding all the absolute daily changes in the cumulative net amount priced along the marketing window. This variable is expressed as a percentage of total production, and is equal to 100% for programs that only recommend cash sales of grain. On the other hand, when a program frequently recommends buy and sell transactions, or when extreme long and short position are recommended, this measure is greater than 100%. Graphically, this measure is the sum of all steps up and down in the marketing profile line along the marketing window.[7] For example, the value for the sum of changes in amount priced is 104% for AgLine by Doane (cash) in 1999 (Figure 3, Panel A), and 1,896% for Utterback Marketing Services in the same crop year (Figure 4, Panel A).

Total traded volume corresponds to the total amount transacted in cash and derivatives markets and is also expressed as a percentage of total production. The minimum for this variable is 100%, since a program will have all grain sold at the end of the marketing window. When only cash transactions are recommended the total traded volume will be 100%, but derivatives allow trade to exceed production since positions can be offset.[8] This measure will be higher for those programs with an intense use of derivatives markets. For example, the value for total traded volume for the 2000 crop year is 103% for AgLine by Doane (cash) and 901% for Utterback Marketing Services (Panels B in Figures 3 and 4, respectively).

For several recommendation sets the values for the sum of changes in amount priced and total volume traded coincide. This is because changes in price exposure are identical to traded volume for cash transactions. However, this is not the case for futures, options and combinations

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[7] Changes in the amount priced due to changes in options deltas are not considered in the sum of changes in amount priced since they do not represent the intention of the program to change the position in the market

[8] In most cases, for programs that recommend only cash transactions this measure is slightly different from 100%. This difference is due to an adjustment in the marketing profile at harvest, when the amount priced is converted from being expressed over expected production to being expressed on actual production.

of transactions that will be counted differently for both measures. For example, consider a program that recommends buying at the money puts for 30% of the production and the delta for the option is 0.5. This transaction will add 30% for the total traded volume and only 15% to the sum of changes in amount priced.

Distance between extreme positions is computed as the difference between the most extreme points in the marketing profile. Graphically, it is the vertical distance between the most distant vertical points in the profile (Figure 5, Panel A). This variable indicates whether the program has made recommendations that imply large bets on futures price movements. Those programs that recommend only cash sales transaction have values of 100% for this measure, the minimum value that the distance can take, while programs using derivatives may have higher distance values. An example of the latter is given by a distance between extreme positions of 133% for Utterback in 2001 (Figure 4, panel C).

The difference from the benchmark marketing profile is computed by adding the absolute differences between the proportion priced according to the program's recommendation and the proportion priced according to the 20-month market benchmark for each day in the marketing window. Graphically, this is the area between the advisory program marketing profile and the benchmark profile (Figure 5, Panel A). This variable measures the difference between the recommendations delivered by a program and a naïve strategy of equally spreading sales along the marketing window.

Variability of the marketing profile is computed by first calculating the average profile for each program across years and then computing the area between the program profile in each year and this average (Figure 5, Panel B). Finally an average of the area across years is computed. This measure represents the mean absolute deviation from an average profile, or in other words, how variable is the set of recommendations from one year to the next. Note that this measure is comparable to the measure of activeness computed by Cunningham et al. (2004) for wheat farmers.

The first four variables are computed for each program in each year. That is, they are time-varying variables. The last variable, which measures variability in the marketing profile, has only one value for each program. Figures 6 and 7 show average values for the style measures for each program in corn and soybeans, respectively. The figures for corn and soybeans are similar in terms of median values, dispersion patterns and ordering of programs, indicating that firms have a similar style for both crops. This is reasonable given that, in many cases, it is the same market analyst who develops the recommendations for both markets. Note also that the ordering of programs in the scatter plots is similar across activeness measures. Correlations between measures within the same crops and between crops are shown in Table 2. This table provides evidence of the high correlation between activeness measures within the same crop and across crops. The average correlation between activeness measures is 0.70 within corn, 0.69 within soybeans and 0.68 across crops. Some measures are more closely related than others. For instance, the correlation between total traded volume and sum of changes in amount priced is above 0.90 within the same crop and above 0.80 between crops. As mentioned above, these two measures take very similar values for many marketing programs. The variability of the marketing profiles and the difference from the benchmark marketing profile are also highly correlated, indicating that those programs that deviate more from a benchmark profile have larger changes in the marketing strategies from year-to-year.

The panels in Figures 6 and 7 share a common pattern, as they show a concentration of programs for the lowest values of the activeness measures and a few programs with extremely high values. For example, the median for the sum of changes in the amount priced is 206% for corn and 245% for soybeans (Panel A, Figures 6 and 7). These values indicate that the median program recommends changes in amount priced equal to about twice the annual production level.[9] The maximum value for this measure is 999% for corn and 961% for soybeans, values that correspond to highly active marketing programs. The chart for total traded volume (Panel B) is similar to the chart for sum of changes in amount priced. Recall that these two measures are highly correlated. The median values for total traded volume are 238% and 223% for corn and soybeans, respectively.

For the distance between extreme positions (Panel C in Figures 6 and 7), almost all the programs have values between 100% and 125%, indicating that advisory programs rarely recommend hedging more than 100% of expected or actual production or recommend taking an outright long position (net amount priced <0%). Two programs have relatively high values for this measure, 169% and 185% for corn and 144% and 172% for soybeans, respectively.

Panel D in Figures 6 and 7 plots the values for the average difference from the benchmark marketing profile. Recall that this measure is the average across years of the shaded area between the program's profile and the benchmark profile. To obtain a more meaningful measure it is possible to translate these values to average daily deviations by dividing the values plotted in the chart by the number of days in the marketing window. For both crops, the median values for this measure correspond to a daily average deviation of 11% and the most extreme values to a daily deviation close to 40%. The last panels in Figures 6 and 7 show the values for marketing profile variability. The median for this measure, expressed on a daily basis, is 12% and 11% for corn and soybeans, respectively. Similar to the average difference from the benchmark profile, the highest values for this measure are close to 40% for both crops.

## Procedures and Results

The methods applied in this study include two statistical procedures: cluster analysis and panel data regression. The details of the methods employed, as well as the results obtained are presented in the following two sections.

### *Cluster Analysis*

Cluster analysis is conducted to group programs according to their degree of activeness. The number of style groups was predetermined to be three, since according to the patterns observed in Figures 6 and 7 it seems reasonable to distinguish three groups. The groups are given the following names: group I: conservative, group II: active and group III: very active. The clustering procedure employed is the nonhierarchical method *k-means* (Johnson and Wichern, 2002). Basically, *k-means* is an iterative algorithm that assigns programs to the group that is more similar in terms of Euclidean distance. The Euclidean distance is computed as the straight

[9] Note that these values can be related to a quite conservative marketing program. For example, this measure takes the value of 200% for a program than opens a hedging position for 50% of expected production during pre-harvest and then does not lift the hedge on the same day as the cash sale of the crop.

line between two multi-dimensional observations. To compute the Euclidean distance, it is necessary that all objects have observations for all variables. Consequently, the cluster analysis is applied to a subset of the sample. This sub-sample includes the programs tracked by AgMAS in all crop years from 1997 to 2001 (19 programs for corn and 17 programs for soybeans). The variables considered to compute distance between programs are the activeness measures from the crop years 1997 to 2001. Since variables are quite different in magnitude, they are standardized before applying the *k-means* algorithm. The *k-means* method does not always generate exactly the same grouping, since the result depends on the starting point (initial grouping) that is randomly selected. To obtain a more reliable result the algorithm was run 200 times and programs were assigned to the style group in which they appeared in most of the runs. Results across runs were similar, with many programs appearing in the same group in all runs.

After constructing the style groups, paired t-tests are employed to evaluate the significance of the differences in price levels between style groups and against the market benchmark. The t-statistics are constructed in the following manner. First the average net price obtained by each group ($g$) in each crop year ($t$) is computed,

$$advisory\ \ price_{gt} = \frac{1}{N_g}\sum_{j \in g} advisory\ \ price_{jt}\ , \tag{1}$$

where $N_g$ is the number of programs in group $g$ and $advisory\ price_{jt}$ is the price obtained by program $j$ in year $t$. Then the difference between the group average price and the market benchmark price for each crop year is computed as:

$$y_{gt} = advisory\ \ price_{gt} - benchmark\ \ price_t\ , \tag{2}$$

and the estimate of expected pricing performance for each activeness group is:

$$\hat{y}_g = \frac{1}{T}\sum_{t=1}^{T} y_{gt}\ , \tag{3}$$

where $T=5$, is the number of time series observations in the sample. Finally, the t-statistics for testing whether expected performance if different from zero is computed as:

$$t = \frac{\hat{y}_g}{\hat{\sigma}_{y_{gt}} / \sqrt{T}} \tag{4}$$

Note that the group average price in each crop year is considered to be one observation, which results in a total of five observations for the computation of the t-statistics.[10]

The grouping of programs obtained through clustering is presented in Table 3. This table shows the composition for the three style groups: conservative, active and very active. Note that the grouping is similar for both crops, with the most conservative group being the largest containing 10 programs for corn and 12 programs for soybeans. As shown in the upper part of Table 4, all the average values for the activeness measures are the highest for the very active group and the lowest for the conservative group. The last part of Table 4 shows performance measures for each style group. Note that, in the period considered, the average price obtained by the three groups is greater than the 20-month benchmark for both crops. Note also that there

[10] This approach probably underestimates the amount of information provided by the sample and it is considered a conservative procedure. Later versions of this study will consider the construction of the t-statistics in more detail.

appears to be a positive relationship between activeness degree and pricing performance. For both crops, the most active group had the highest performance, the conservative group the lowest performance and the active group was in the middle. For corn, the average price for the very active group is 18¢/bu. higher than the average price for the conservative group and 17¢/bu. higher than the price for the active group. For soybeans, the price difference between the very active and the conservative groups is 51¢/bu. and between the very active and the active groups is 15¢/bu. Table 5 presents the results for the t-tests for differences in performance. The values in the diagonal correspond to the tests for the difference between each group performance versus the benchmark. This difference is significant at the 90% confidence level for the three groups in corn and for the active and very active groups in soybeans. The differences in performance across activeness groups are not statistically significant for corn. In soybeans, the differences in performance between the very active versus the conservative group and the active versus the conservative group are statistically significant.

These results suggest a tendency, stronger for soybeans, of more active advisory programs obtaining higher prices. However, note also that risk, as measured by standard deviation, is the highest for the very active group and the lowest for the conservative group for both crops (bottom of Table 4). The results suggest that there is a tradeoff between high risk-high performance and low risk-low performance style groups. It appear that there is not a style group that would be preferred by all farmers, instead farmers would select advisory programs based on their marketing preferences and risk attitudes. Moreoever, more active programs are more expensive for farmers, as shown in the last row of Table 4. The cost values presented in the Table represent the averages per group of the annual subscription fees per farm charged by the advisory services. While the magnitude of subscription costs is quite small compared to farm revenue levels, farmers may still consider differences in fees when selecting advisory programs.

*Panel Regression Models*

As a second step, the relationship between the degree of activeness and pricing performance is tested using a time-series/cross-section data regression model. For this analysis all programs marked with a star (*) in Table 1 are included for all the crop years that are indicated in parenthesis after the programs' names. Instead of including the individual values of the activeness measures in the regression models, an "activeness index" is generated to be used as explanatory variable. Specifically, the programs were ranked according to each of the measures in each of the crop years. Then the activeness index for each program for each year is set equal to average rank across style measures. The ranking method assigns a lower rank to programs with low values for the activeness measures. A lower value of the index indicates that the program recommended a more conservative marketing strategy than programs with higher index values. There are two reasons for using an activeness index instead of the individual measures. First, the activeness measures are, in general, highly correlated, thus causing multicollinearity problems that prevent a reasonable interpretation of the regression coefficients. Second, it is more interesting to analyze the relationship between the overall activeness degree in the price performance of the program, rather than the effect of the individual measures.

The regression estimated is based on the random-effects model (Green, 1993) which allows for a program specific error component, and can be written as:

$$y_{it} = \alpha + x_{it}\beta + w_{it}$$
$$w_{it} = u_i + \varepsilon_{it} \quad , \tag{5}$$

where $y_{it}$ is the difference between the price obtained by program $i$ and the benchmark price in year $t$ , and $x_{it}$ is the activeness index. The error term ($w_{it}$) consists of an unobservable individual effect $u_i$, that is constant through time and a pure random effect $e_{it}$. Note that $w_{it}$ is independent across programs but correlated within the same program. Generalized least squares (GLS, Balestra-Nerlove) estimates are computed. Following the first estimation, diagnostic tests on residuals for endogeneity, heteroskedasticity and autocorrelation are conducted. Based on the Hausman test for endogeneity, the null hypothesis of no correlation between the error term and independent variable was not rejected (p-value=0.16 for corn and p-value=0.36 for soybeans). The likelihood ratio test for heteroskedastity and Wooldridge test for autocorrelation in panel data were computed. Results indicate that residuals show panel level hetersokedasticy (p-value< 0.001 for corn and soybeans) and autocorrelation (p-values <0.001 for corn and 0.05 for soybeans). Then, a final model was estimates by GLS, allowing the residual to have different variance across programs $(Var(u_i) = \sigma_i^2)$ and autocorrelation of order one.

Panels A and B in Table 6 show the results from the model estimation for corn and soybeans, respectively. Note first the $R^2$ values presented in the upper left corners in both panels. The *within-*$R^2$ indicates how much of the performance variability across years, is explained by changes in the activeness index from year-to-year within programs.[11] The values presented indicate that the activeness index explains only 0.2% and 7.3% of within program performance variation for corn and soybeans, respectively. These values indicate a weak relationship between activeness and performance within the same program. The *between-*$R^2$ measures the proportion of the variation in performance across programs that is related to differences in the activeness index across programs.[12] Note that *between-*$R^2$*s* are much larger than *within-*$R^2$*s*, for both crops. The values indicate that about 20% and 40% of the variation in average performance across programs is explained by variation in the activeness index for corn and soybeans, respectively. The difference between the magnitudes of *within* versus *between-*$R^2$ is related to the fact that activeness degree is quite stable across years for the same program and highly variable across different programs.

The first part of Panel A in Table 6 presents the estimation results for the corn model. The estimate for the relationship between the activeness index and performance is positive (0.002) but not significant with a p-value of 0.6. This result is similar to the one obtained by comparing the style groups from the cluster analysis, where point estimates also indicate that more active programs achieve higher prices, but the differences in performance across activeness levels are not significant.

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[11] The *within-*$R^2$ is the $R^2$ from the regression in terms of deviations from the program means: $(y_{it} - \bar{y}_{i.}) = \beta(x_{it} - \bar{x}_{i.}) + \varepsilon_{it} - \bar{\varepsilon}_{i.}$, where $\bar{y}_{i.}$ is the mean performance across years for program $i$, $\bar{x}_{i.}$ is the mean activeness index for program $i$ and $\bar{\varepsilon}_{i.}$ is the mean error (as defined in the original model from equation (5)) for program $i$.

[12] The between*-*$R^2$ is the $R^2$ from the regression in terms of programs means:. $\bar{y}_{i.} = \alpha + \beta\bar{x}_{i.} + \bar{\varepsilon}_{i.}$

In the case of soybeans the relationship between activeness and performance appears to be stronger. The activeness index coefficient in the base model is larger, positive (0.02) and significant with a p-value < 0.001 (Table 6, Panel B). This value indicates that an increase by one unit in the activeness index is related to an increase in advisory price of 2¢/bu. For instance, the expected difference between two programs that are ranked 5$^{th}$ and 15$^{th}$ based on their activeness degree is 20¢/bu. Recall that a significant relationship between activeness level and performance was also obtained from comparing styles groups from the cluster analysis.

Overall, there is a positive association between activeness and performance, with the relationship being significant in soybeans, but not in corn. Programs that have a more active set of recommendations tend to achieve higher prices in the soybean market. However, results do not necessarily mean that those market consultants who develop conservative programs, such as cash-only programs do not have access to any private information. These programs have strong restrictions on the kind of transactions that they can recommend. These restrictions put limits on the possibility of trading profits, even when private information is available, but also control the risk level of the marketing strategy. As was mentioned before, more active programs imply higher risk, and therefore conservative programs are probably reasonable for risk-averse farmers. Finally, it is necessary to consider that the sample is small, despite being the most complete data set available on agricultural advisory services pricing recommendations. Results should be interpreted in light of the limitation of a small sample size.

**Summary and Conclusions**

Previous research results indicate that market advisory programs have wide differences both in pricing performance and marketing style. This study analyzes the activeness degree of advisory programs and evaluates the relationship between activeness degree and pricing performance. Five measures are employed to define the activeness degree of advisory programs: the sum of changes in amount priced, total traded volume, distance between extreme positions, difference from the benchmark marketing profile and variability in the marketing profile.

A cluster method is employed to classify the advisory programs in three style groups: conservative, active and very active. For both crops, the most active group had the highest performance, the conservative group the lowest performance and the active group was in the middle. For corn, the average price for the very active group is 18¢/bu. higher than the average price for the conservative group and 17¢/bu. higher than the price for the active group. For soybeans, the price difference between the very active and the conservative groups is 51¢/bu., and between the very active and the active groups is 15¢/bu. The differences in performance across groups are significant only for soybeans.

A panel data regression model was estimated to measure the relationship between activeness level and price performance. Estimation results indicate a positive relationship between the degree of activeness and the price obtained by the programs, the effect being significant only for the soybeans market. For soybeans, the estimates indicate that an increase by one unit in the ranking position according to the activeness level is related to an increase in advisory price of 2¢/bu. For instance, the expected difference between two programs that are ranked 5$^{th}$ and 15$^{th}$ based on their activeness degree is 20¢/bu.

Overall, there is a positive association between activeness and performance, with the relationship being significant in soybeans, but not in corn. Programs that have more active sets of recommendations tend to achieve higher prices in the soybean market. The positive relationship between activeness and performance suggests that active programs are based on superior information and/or analytical skill. These results are of major interest for farmers selecting among advisory services, and also provide information about the process that advisory programs use to develop market recommendation.

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## Table 1. Market Advisory Programs Tracked by the AgMAS Project

| ID | Market Advisory Program | Crop Years Tracked by AgMAS | |
|---|---|---|---|
| 1 | Ag Alert for Ontario | (1996) | |
| 2 | Ag Financial Strategies | (2001) | |
| 3 | Ag Profit by Hjort | (1995-1998) | |
| 4 | Ag Review | (1995-2001) | * |
| 5 | AgLine by Doane (cash only) | (1995-2001) | * |
| 6 | AgLine by Doane (hedge) | (1996-2001) | * |
| 7 | AgResource | (1995-2001) | * |
| 8 | Agri-Edge (cash only) | (1995-1997) | |
| 9 | Agri-Edge (hedge) | (1995-1997) | |
| 10 | Agri-Mark | (1995-2000) | * |
| 11 | AgriVisor (aggressive cash) | (1995-2001) | * |
| 12 | AgriVisor (aggressive hedge) | (1995-2001) | * |
| 13 | AgriVisor (basic cash) | (1995-2001) | * |
| 14 | AgriVisor (basic hedge) | (1995-2001) | * |
| 15 | Allendale (futures & options) | (1996-2001) | * |
| 16 | Allendale (futures only) | (1995-2001) | * |
| 17 | Brock (cash only) | (1995-2001) | * |
| 18 | Brock (hedge) | (1995-2001) | * |
| 19 | Cash Grain | (1999-2000) | |
| 20 | Co-Mark | (2000-2001) | |
| 21 | Freese-Notis | (1995-2001) | * |
| 22 | Grain Field Marketing | (2001) | |
| 23 | Grain Field Report | (1995) | |
| 24 | Grain Marketing Plus | (2000-2001) | |
| 25 | Harris Weather/Elliott Advisory | (1995-1996) | |
| 26 | North American Ag | (1995) | |
| 27 | Northstar Commodity | (2001) | |
| 28 | Pro Farmer (cash only) | (1995-2001) | * |
| 29 | Pro Farmer (hedge) | (1995-2001) | * |
| 30 | Progressive Ag | (1996-2001) | * |
| 31 | Prosperous Farmer | (1995) | |
| 32 | Risk Management Group (cash only) | (1999-2001) | |
| 33 | Risk Management Group (futures & options) | (1999-2001) | |
| 34 | Risk Management Group (options only) | (1999-2001) | |
| 35 | Stewart-Peterson Advisory Reports | (1995-2001) | * |
| 36 | Stewart-Peterson Strictly Cash | (1995-1999) | * |
| 37 | Top Farmer Intelligence | (1995-2001) | * |
| 38 | Utterback Marketing Services | (1997-2001) | * |
| 39 | Zwicker Cycle Letter | (1995-1998) | |

Note: A star (*) indicates the the program is considered in the current study for style analysis

**Table 2. Correlation between Activeness Measures for Market Advisory Programs, 1995 - 2001 Crop Years**

| | | Corn | | | | | Soybeans | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sum of changes in amount priced | Total traded volume | Distance between extreme positions | Difference from benchmark marketing profile | Variability of the marketing profile | Sum of changes in amount priced | Total traded volume | Distance between extreme positions | Difference from benchmark marketing profile | Variability of the marketing profile |
| **Corn** | Sum of changes in amount priced | 1 | | | | | | | | | |
| | Total traded volume | 0.92 | 1 | | | | | | | | |
| | Distance between extreme positions | 0.66 | 0.73 | 1 | | | | | | | |
| | Difference from benchmark marketing profile | 0.59 | 0.68 | 0.57 | 1 | | | | | | |
| | Variability of the marketing profile | 0.61 | 0.61 | 0.69 | 0.91 | 1 | | | | | |
| **Soybeans** | Sum of changes in amount priced | 0.91 | 0.84 | 0.54 | 0.54 | 0.57 | 1 | | | | |
| | Total traded volume | 0.86 | 0.89 | 0.62 | 0.58 | 0.54 | 0.93 | 1 | | | |
| | Distance between extreme positions | 0.63 | 0.67 | 0.69 | 0.46 | 0.57 | 0.69 | 0.75 | 1 | | |
| | Difference from benchmark marketing profile | 0.62 | 0.61 | 0.56 | 0.80 | 0.94 | 0.66 | 0.66 | 0.63 | 1 | |
| | Variability of the marketing profile | 0.58 | 0.57 | 0.66 | 0.87 | 0.96 | 0.55 | 0.50 | 0.57 | 0.95 | 1 |

**Table 3. Cluster Analysis Results for Market Advisory Programs, 1997 - 2001 Crop Year**

| Corn | | Soybeans | |
|---|---|---|---|
| **Style Group** | **Programs Included** | **Style Group** | **Programs Included** |
| Group I: conservative | AgReview | Group I: conservative | AgReview |
| | AgLine by Doane (cash only) | | AgLine by Doane (cash only) |
| | AgLine by Doane (hedge) | | AgriVisor (aggressive cash) |
| | AgriVisor (aggressive cash) | | AgriVisor (aggressive hedge) |
| | AgriVisor (aggressive hedge) | | AgriVisor (basic cash) |
| | AgriVisor (basic cash) | | AgriVisor (basic hedge) |
| | AgriVisor (basic hedge) | | Allendale (futures only) |
| | Brock (cash) | | Brock (cash) |
| | Freese Notis | | Freese Notis |
| | ProFarmer (cash ) | | ProFarmer (cash ) |
| | | | ProFarmer (hedge) |
| | | | Progressive Ag |
| Group II: active | Allendale (futures and options) | Group II: active | Brock (hedge) |
| | Allendale (futures only) | | Stewart Peterson Advisory Reports |
| | Brock (hedge) | | Top Farmer Intelligence |
| | ProFarmer (hedge) | | |
| | Progressive Ag | | |
| | Stewart Peterson Advisory Reports | | |
| | Top Farmer Intelligence | | |
| Group III: very active | AgResource | Group III: very active | AgResource |
| | Utterback Marketing Services | | Utterback Marketing Services |

## Table 4. Activeness and Performance Measures by Style Group for Market Advisory Programs, 1997-2001 Crop Years

| | | Corn | | | Soybeans | | |
|---|---|---|---|---|---|---|---|
| | | **Group I Conservative (10 programs)** | **Group II Active (7 programs)** | **Group III Very active (2 programs)** | **Group I Conservative (12 programs)** | **Group II Active (3 programs)** | **Group III Very active (2 programs)** |
| **Panel A. Activeness measures** | | | | | | | |
| Sum of changes in amount priced | (%) | 143 | 443 | 854 | 180 | 692 | 842 |
| Total traded volume | (%) | 140 | 371 | 815 | 174 | 484 | 838 |
| Distance between extreme positions | (%) | 101 | 107 | 185 | 104 | 115 | 167 |
| Difference from benchmark marketing profile | | 6,188 | 10,173 | 22,507 | 7,063 | 10,712 | 20,934 |
| Variability of the marketing profile | | 5,175 | 7,897 | 17,194 | 5,674 | 9,035 | 15,784 |
| **Panel B. Performance measures** | | | | | | | |
| Net advisory price | ($/bu) | 2.12 | 2.13 | 2.30 | 5.66 | 6.02 | 6.17 |
| Difference from benchmark price | ($/bu) | 0.06 | 0.06 | 0.24 | 0.11 | 0.47 | 0.62 |
| Standard deviation of difference | ($/bu) | 0.04 | 0.04 | 0.24 | 0.13 | 0.34 | 0.44 |
| Subcription cost | ($/year) | 291 | 342 | 425 | 326 | 302 | 425 |

**Table 5. Test Statistics for Differences in Performance versus the Market Benchmark and Across Style Groups**

**Panel A. Corn**

| | Conservative | Active | Very Active |
|---|---|---|---|
| Conservative | 3.57 ** | | |
| Active | 0.10 | 3.46 ** | |
| Very Active | 1.87 | 1.44 | 2.20 * |

**Panel B. Soybeans**

| | | | |
|---|---|---|---|
| Conservative | 1.90 | | |
| Active | 2.31 * | 3.08 ** | |
| Very Active | 2.44 * | 0.92 | 3.15 ** |

Note: The diagonal elements correspond to the t-values for the comparison of each group versus the benchmark. Critical t-values are 2.78 and 2.13 for 5 and 10% significance levels, respectively. One star (*) indicates 10% significance level, two stars (**) indicate 5% significance level.

**Table 6. Results from Panel Data Regression Models for Market Advisory programs, 1997-2001 Crop Years**

$y_{it} = \alpha + x_{it}\beta + w_{it}$
$w_{it} = u_i + \varepsilon_{it}$
$\varepsilon_{it} = \rho\varepsilon_{it-1}$

*y:* pricing performance
*x:* activeness index

**Panel A. Corn Model**

**R-squares from random effect GLS estimation**

| | |
|---|---|
| within programs | 0.002 |
| between programs | 0.204 |
| overall | 0.023 |

**GLS estimation with panel level heteroskedasticity and AR(1) structure in residuals**

| | $\hat{\alpha}$ | $\hat{\beta}$ | | | |
|---|---|---|---|---|---|
| coefficient | 0.021 | 0.002 | autorregresive coefficient | $(\hat{\rho})$ | 0.260 |
| standard error | 0.027 | 0.003 | Wald | $\chi^2$ (1) | 0.270 |
| p-value | 0.428 | 0.606 | p-value | | 0.606 |

**Panel B. Soybean Model**

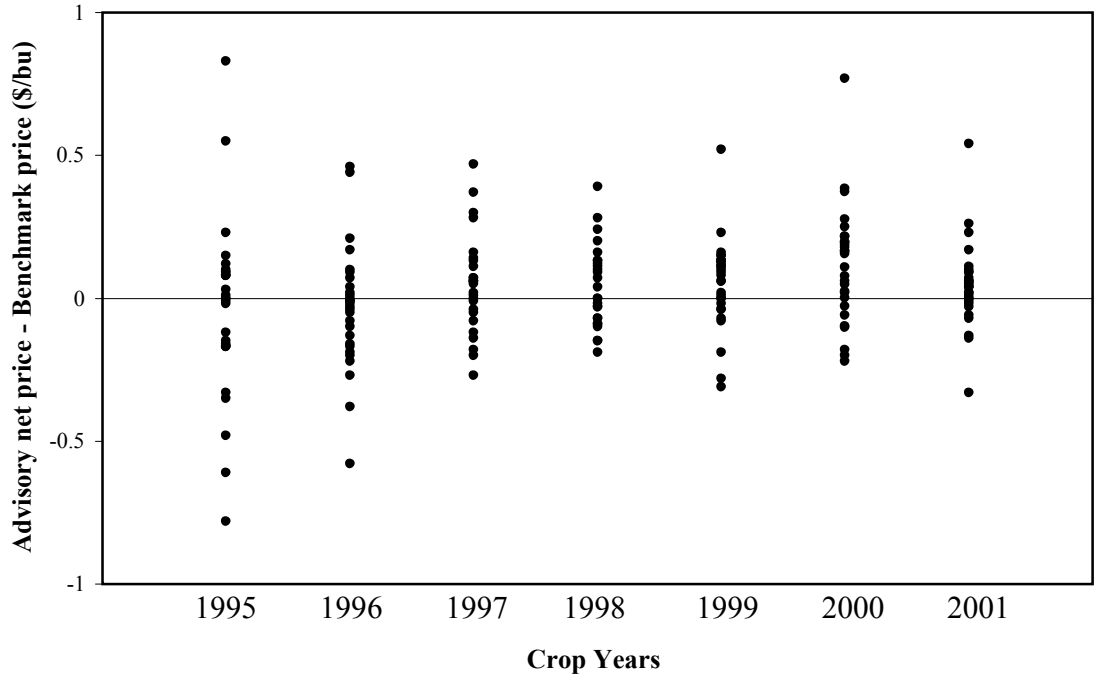
**R-squares from random effect GLS estimation**

| | |
|---|---|
| within programs | 0.073 |
| between programs | 0.401 |
| overall | 0.142 |

**GLS estimation with panel level heteroskedasticity and AR(1) structure in residuals**

| | $\hat{\alpha}$ | $\hat{\beta}$ | | | |
|---|---|---|---|---|---|
| coefficient | 0.021 | 0.019 | autorregresive coefficient | $(\hat{\rho})$ | 0.062 |
| standard error | 0.033 | 0.005 | Wald | $\chi^2$ (1) | 14.82 |
| p-value | 0.536 | 0.000 | p-value | | 0.000 |

**Panel A. Corn**




**Panel B. Soybeans**

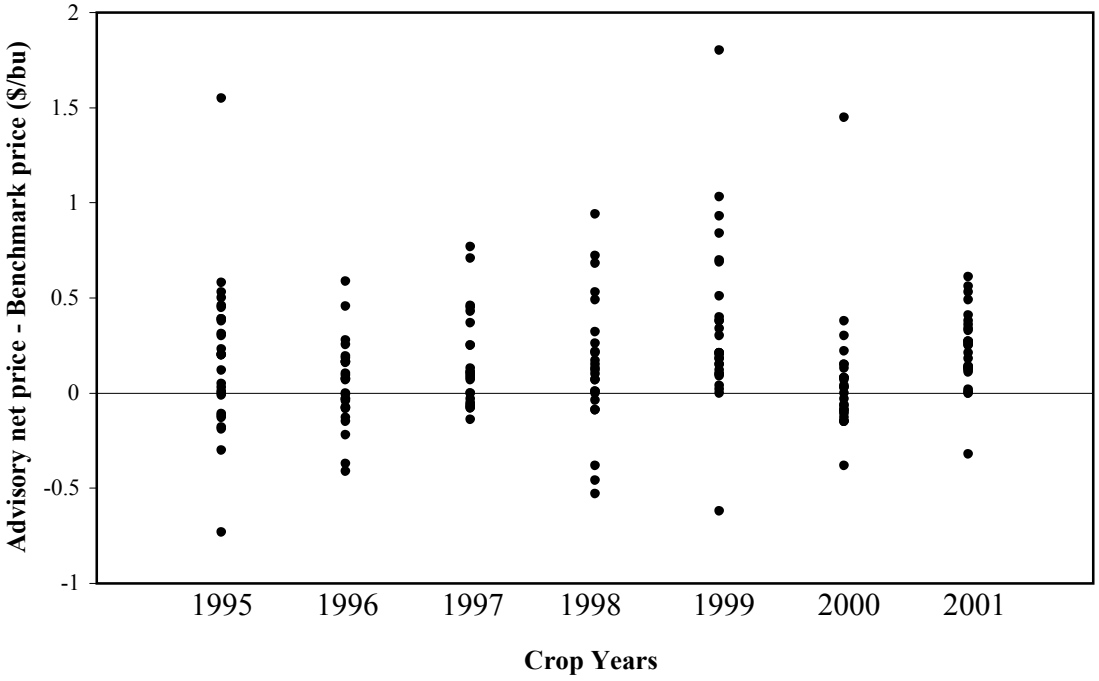
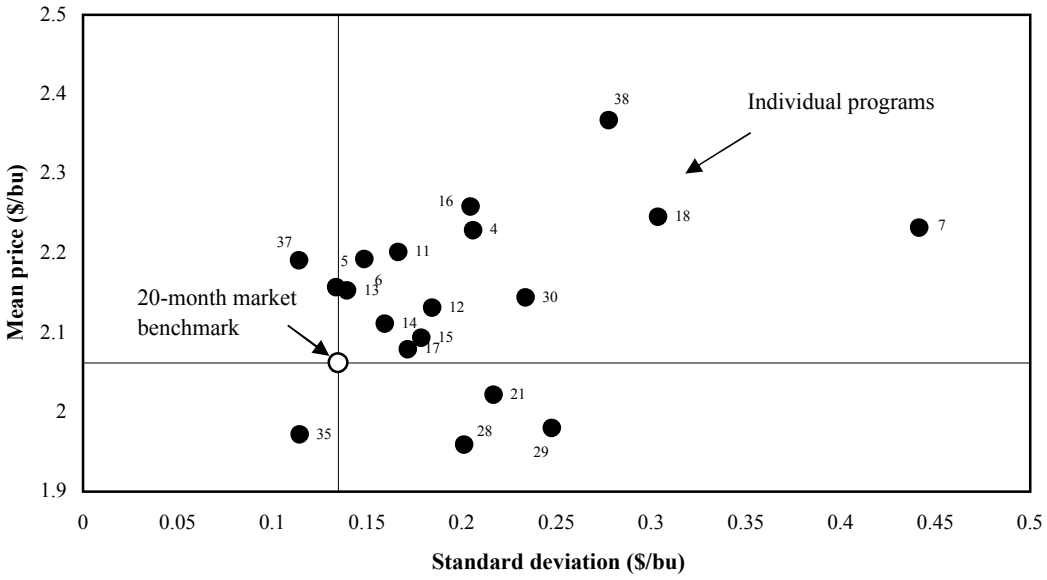
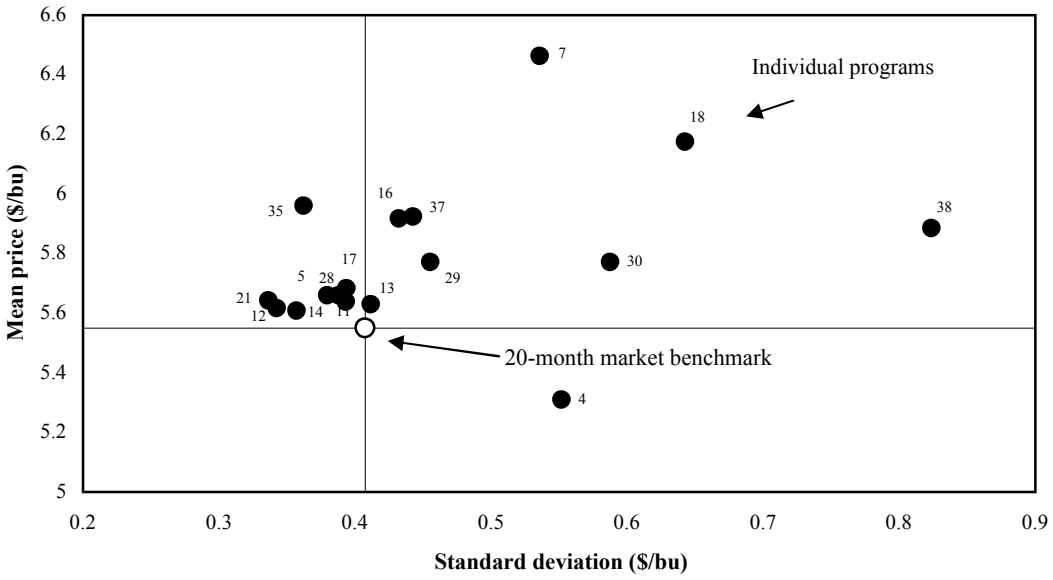



**Figure 1. Difference between the Net Price Obtained by the Advisory Programs and the Market Benchmark Price, 1995 - 2001 Crop Years**

**Panel A. Corn Price**



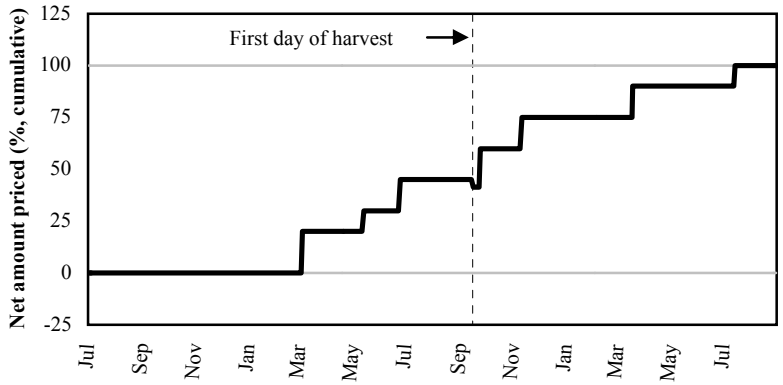

**Panel B. Soybeans Price**



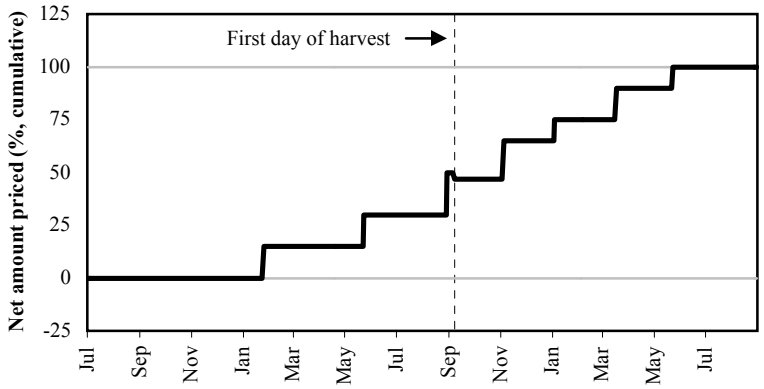

Note: The labels correspond to the program's ID numbers shown in Table 1.

## Figure 2. Mean Price and Price Standard Deviation for Market Advisory Programs, 1997-2001 Crop Years

**Panel A: 1999 Crop Year**




**Panle B: 2000 Crop Year**




**Panel C: 2001 Crop Year**

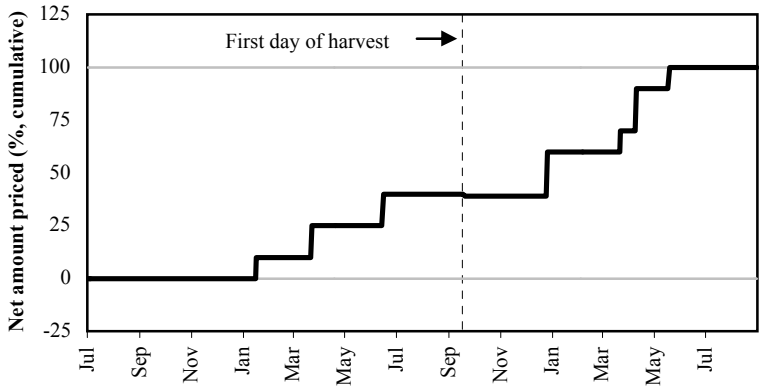
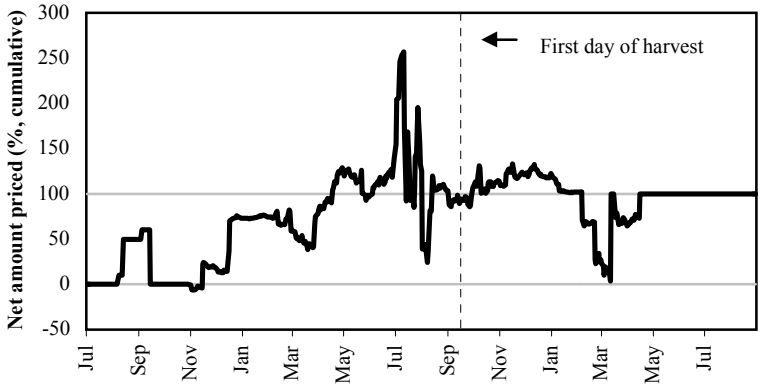
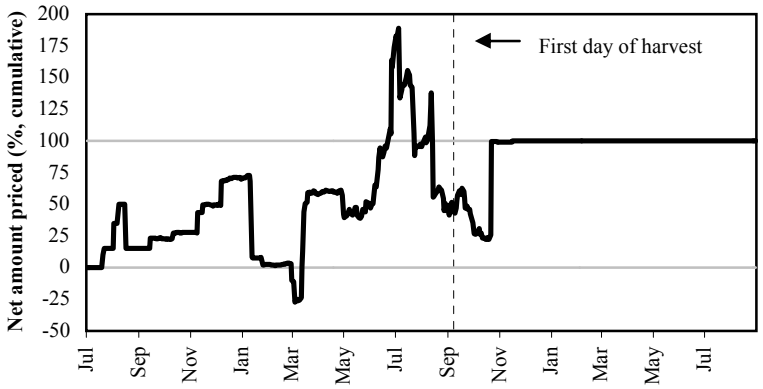



**Figure 3. Examples of Corn Marketing Profiles, AgLine by Doane (cash only), 1999-2001 Crop Years**

**Panel A: 1999 Crop Year**




**Panle B: 2000 Crop Year**




**Panel C: 2001 Crop Year**

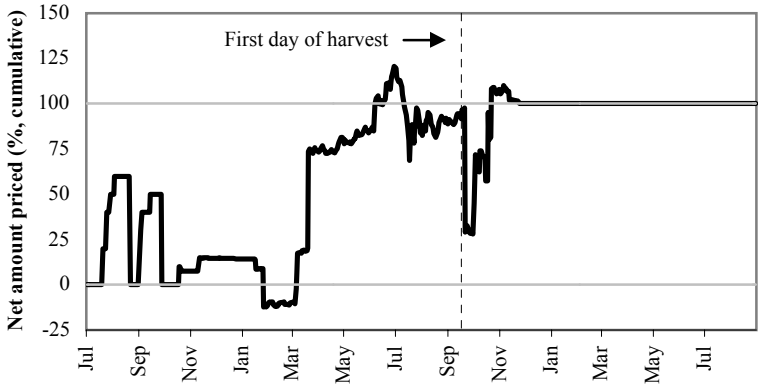
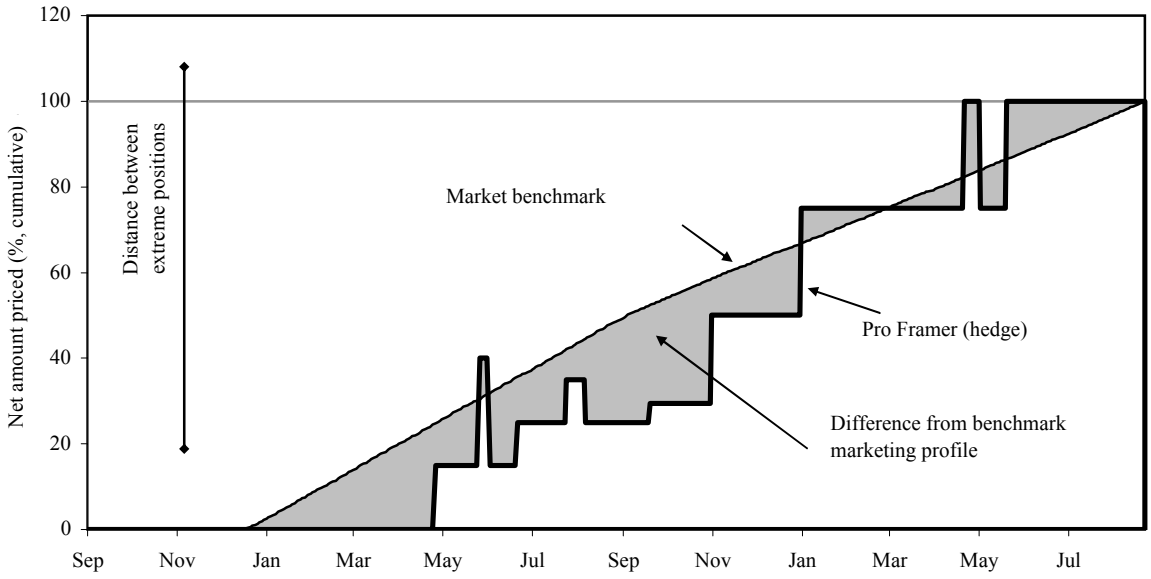



**Figure 4. Examples of Corn Marketing Profiles, Utterback Marketing Services, 1999-2001 Crop Years**

**Panel A. Corn Marketing Profiles for Pro Farmer (hedge) and Market Benchmark, Crop Year 1995**




**Panel B. Corn Marketing Profiles for Pro Farmer (hedge). Crop Years 1995 and 1996 and the 1995-1996 average**

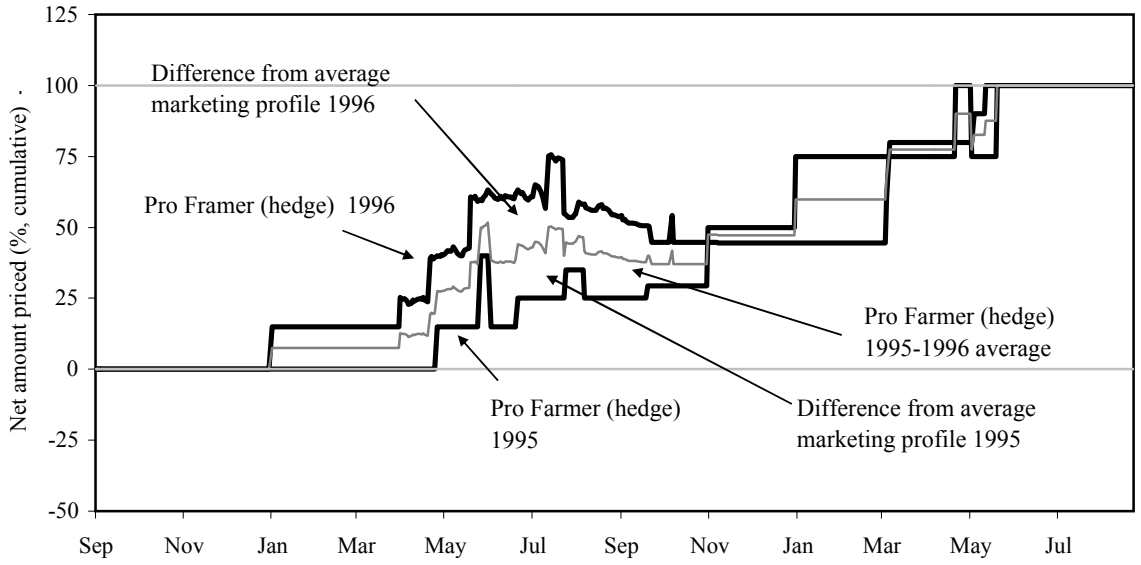



**Figure 5. Graphical Representation of Activeness Measures for Market Advisory Programs**

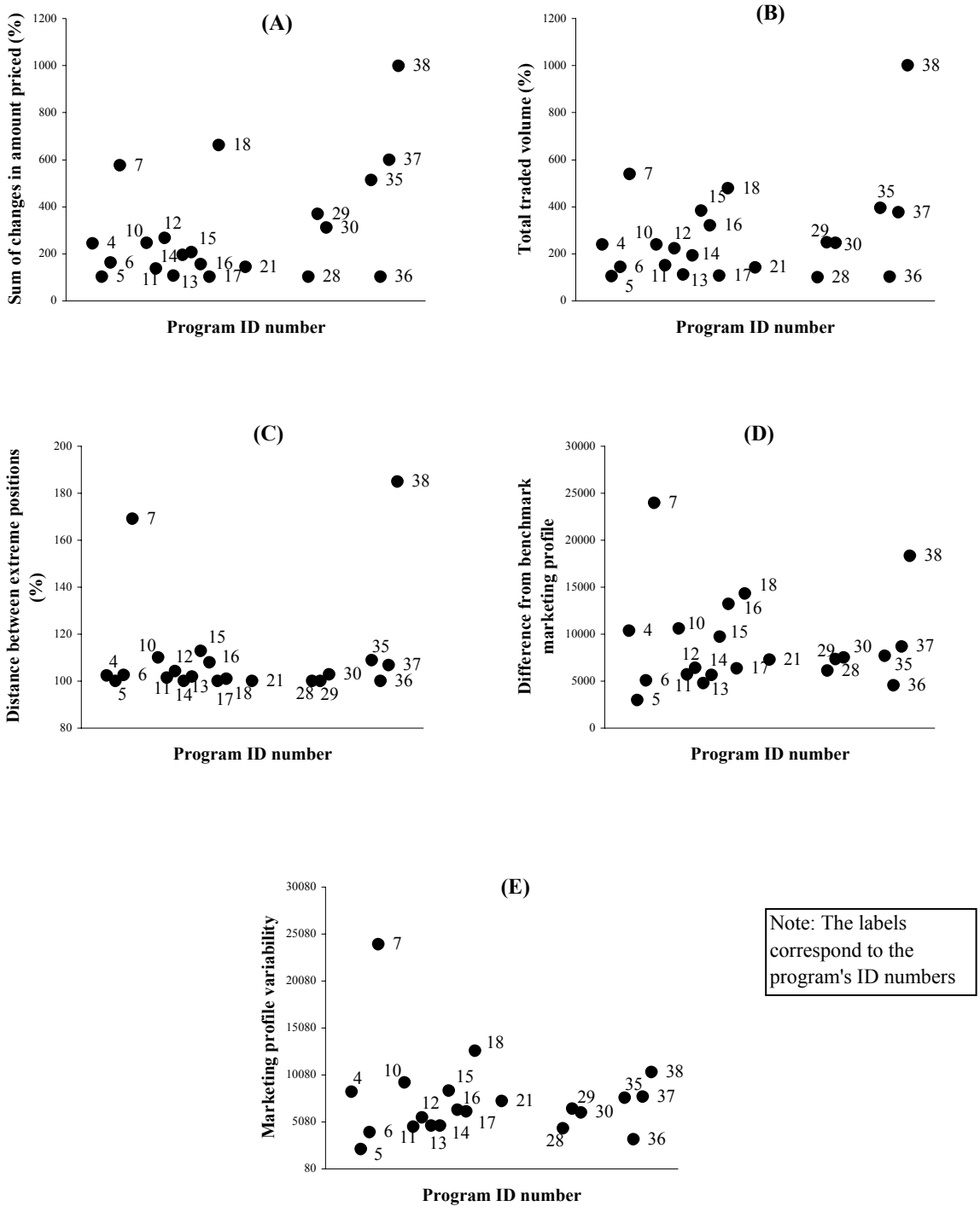



**Figure 6. Values of Activeness Measures for Market Advisory Programs in Corn, Averages 1995-2001 Crop Years**

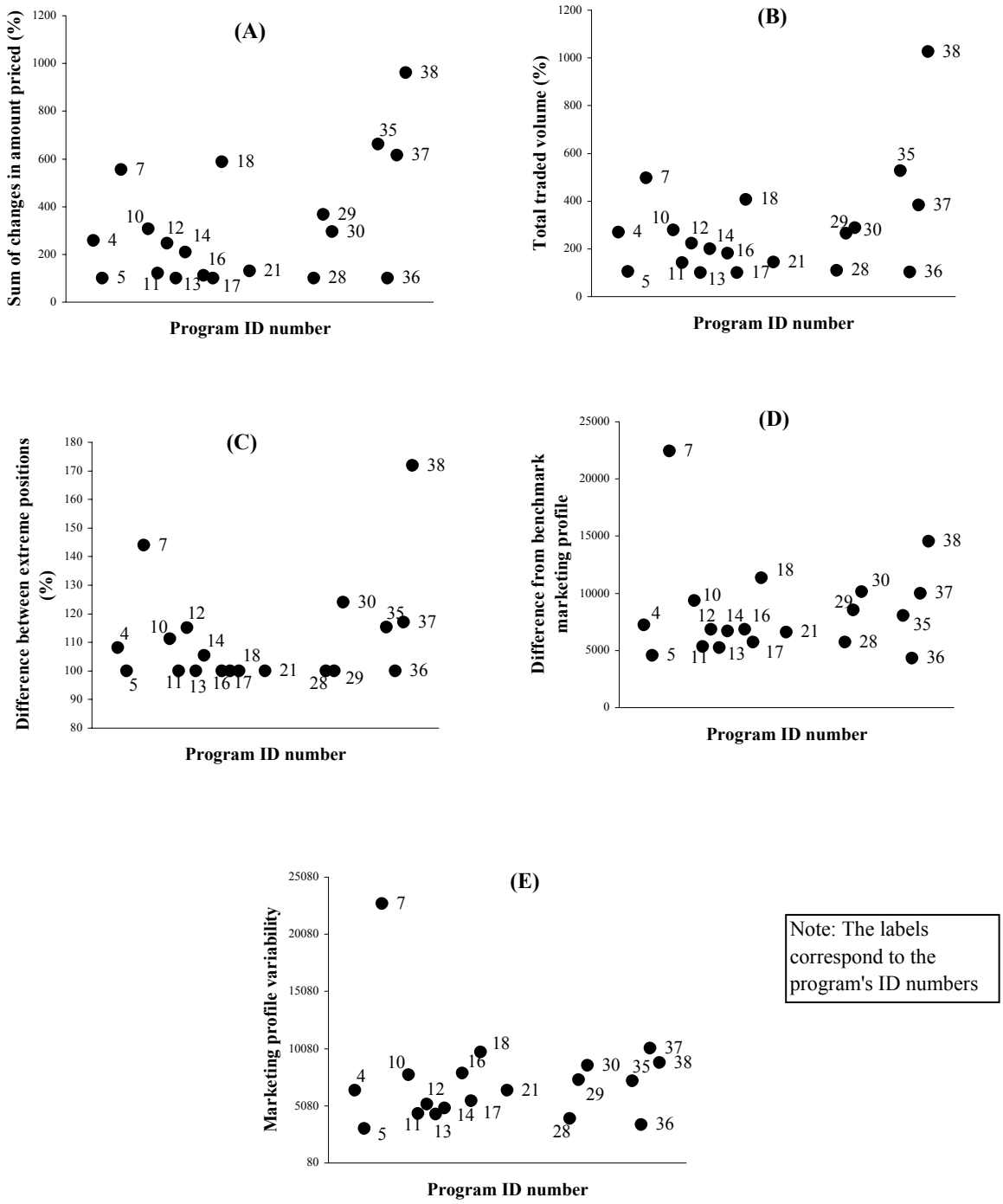



**Figure 7. Values of Activeness Measures for Market Advisory Programs in Soybeans, Averages 1995-2001 Crop Years**