Farmers' Subjective Yield Distributions: Calibration and Implications for Crop Insurance Valuation

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Results are preliminary and incomplete, work in progress.

Abstract:

This paper examines the role of overconfidence in explaining farmer crop insurance purchasing decisions. The authors hypothesize that overconfidence could influence the participation decision and test this hypothesis. The preliminary results indicate that farmers are overconfident; however, the relationship between overconfidence and the insurance use remains uncertain.

Background and Motivation

Despite appealing benefits of crop insurance, farmers' participation in the crop insurance program has been limited. Recently, the participation rate increased to 60-70% in the Midwest after heavy government subsidies. In general, farmers are still reluctant to insure. Assuming risk-averse farmers, this reluctance to insure presents a problem. The literature proposed several explanations to justify farmers' behavior. However, researchers in the field seemed to overlook subjective expectations of the producers. This paper argues that these expectations and their correspondence to reality might be responsible for the lack of interest in the insurance. For example, if the farmer's subjective yield distribution differs from historic yield distribution, his valuation of the insurance might differ from actuarially fair price. Thus, the subjective expectations merit careful analysis. To conduct this analysis, this paper employs the concept of overconfidence. Overconfidence is defined as an individual's propensity to overestimate the precision of the subjective information. It is argued that presence of overconfidence can be responsible for farmers' reluctance to insure.

The purpose of this paper is to investigate the existence of overconfidence in the farmers' risk perceptions and relate it to the various characteristics and to actual production history (APH) insurance purchasing behavior. The study relies on the data from the Crop Yield Risk Survey (CYRS). It uses actual producer history (APH) insurance as a proxy for the MPCI. It utilizes two measures of overconfidence: miscalibration and the BTA effect. This paper performs several procedures to accomplish the objective. It assesses miscalibration by estimating a calibration function between subjective and objective distribution of yields. It examines the presence and the degree of the BTA effect by asking farmers to report their perceptions concerning the level and variability of their yields. This paper assesses how the shape of the derived calibration functions and the BTA effect varies among users and non-users of insurance. It relates miscalibration and the BTA effect to the various individual and farm characteristics such as acreage, age, education, experience, and risk preference.

The data comes from survey which was mailed to 3 000 corn and soybean farmers in Illinois, Iowa, and Indiana. Progressive Farmer, a company specializing in surveying farmers, has complied the list. Farmers with less than 100 acres were not included. To improve survey, 2 focus groups were held. In addition, University staff, and USDA ERS economist reviewed the survey and the survey was pretested before mailing. The survey was accompanied by $3 honor check to be cashed upon completion of the survey. The survey contained several sections, including demographic, business, risk attributes and perceptions (such as level and variability of crop yields, yield histories and yield subjective probability distributions). Response rate for the survey was 29%, which exceeded the usual response rate of 15% (as indicated by Progressive Farmers).

Several audiences could benefit from the insights presented by this research. The findings could be of interest to academia by illustrating an application of behavioral finance (BF) to current issues in agricultural finance. The use of overconfidence to explain a low participation is the novelty because the application of BF to the issues in agricultural finance has been limited. The findings may also benefit insurance companies and farmers. By analyzing the bias in the light of various characteristics, this research may assist in identifying various groups with different insurance needs. For example, if the research identifies that education level impacts overconfidence, then farmers' education level might be used as a predictor of their purchasing decisions. Knowing these groups will allow insurance companies to develop products tailored to each group, thus improving a product selling process.

Preliminary results suggest that farmers, on average, are overconfident. Miscalibration decreases with education, high school graduates tend to be the most overconfident, and the university graduates tend to be the least miscalibrated. The BTA effect depends on the farm size, only 2% of large farms owners indicated that their mean yield is less than county average.

Literature Review

The literature review consists of three parts. The first part discusses overconfidence; the second part presents developments in the literature for crop insurance, and the third presents related research on flood and earthquake insurance. The paper discusses related research on flood and earthquake insurance to justify inclusion of various individual characteristics of farmers.

Overconfidence

Biases in the decision making are an important part of behavioral finance. Perhaps, the most researched bias is overconfidence. A dictionary of psychology in politics and social sciences labels the concept as the overconfidence effect and defines it: “Unwarranted belief in the correctness of one’s judgments or beliefs.” In the behavioral finance literature, the overconfidence effect is termed simply overconfidence. The paper utilizes behavioral finance terminology.

Recently, overconfidence has received a considerable amount of the research attention in economics. It is defined as a tendency to overestimate the precision of one's information (Glaser and Weber, 2004). According to the literature, this bias is present everywhere. Gervais, Heaton, and Odean (2002) report that overconfidence has been noticed in almost all professions, from management to nursing. Currently, the literature on overconfidence distinguishes between three types of overconfidence: miscalibration, optimism and the better than average effect (Glaser and Weber, 2004).

Lichtenstein et al. (1982) cited several papers on calibration and the elicitations of the confidence intervals for unknown quantities. They reported that individuals tend to provide tight intervals when asked to supply a probability distribution on the unknown quantity. This tendency has been labeled miscalibration in the literature. Most of the research studied miscalibration in two situations: 1) when individuals were asked to assess unknown quantity using fractile methods, and 2) when individuals were asked to answer a question and to provide a subjective probability of how certain they are in that their answer were correct (Lichtenstein et al. 1982). In the first case, the subjective probability distribution elicited was found to be "too tight" (Lichtenstein et al. 1982). In the second case, the subjective probability (supplied by individual) was almost always more than the actual probability of getting the answer right. Also, the miscalibration was greater for difficult tasks (Lichtenstein et al. 1982).

Another component of overconfidence is better than average effect (BTA). The BTA effect refers to the individual's propensity to overestimate his/her skills (Gervais, Heaton, and Odean, 2002). The classical example is presented by Svenson (1981) who found that 80% of drivers thought that they were better drivers than others.

Optimism is defined by Gervais, Heaton, and Odean (2002) as "the belief that future favorable events are more likely than they actually are." They cited several articles that illustrate the optimism and situations where it arises. For example, managers believe that the results of the projects can be controlled and that the projects are less risky than they actually are.

The existing literature is not clear about the relationship between the various measures of overconfidence. Taylor and Brown (1998) suggested that these measures should be correlated, while Biais, Hilton, Mazurier, and Pouget (2004) argued that the measures should not be correlated. Glaser and Weber (2004) assessed the correlation among these measures empirically and found that most of the measures are not correlated.

How is overconfidence measured? In the empirical literature, overconfidence is measured directly and indirectly. Indirectly, a proxy for overconfidence is selected, the proxy is treated as dependent variable, and arguments are made concerning the relationship between overconfidence and independent variables (see for example Gervais S., Heaton J., Odean, 2002, Barber and Odean, 2001). Independent variables are usually variables that illustrate the extent of the heterogeneity in the sample, such as sex, intelligence, age, etc. The hypothesized relationships are measured empirically and results are examined. However, there is a major problem with indirect measurement of overconfidence. The problem lies in the selection of the proxy for overconfidence. While the literature often provides valid arguments as to why, for example, trading frequency (turnover) is a valid variable for overconfidence (Barber and Odean, 2001); the literature does not provide strong reasons why the turnover will be a proxy for *only* overconfidence. This somewhat weakens the empirical results of indirect measurements, because resulting statistical significance may be an indication of the relationship between the independent variable and some other dependent variable for which turnover is a valid proxy as well.

Direct measurement is less prone to this problem because it is designed to strictly measure overconfidence. Directly, overconfidence is usually assessed by examining its components: miscalibration and the BTA effect (see for example Lichtenstein et al. 1982, Kovalchik et.al. 2003, Gervais, Heaton, and Odean 2002). In the assessment of miscalibration, subjects are provided with list of questions, which they answer and state how confident they are that their answer is correct. Their confidence levels are compared to the probability of getting the answer correct. This is called the confidence interval method. Another way of assessing miscalibration is by asking subjects to provide a subjective probability distribution for an unknown quantity. The subjective distribution is then compared to the true, or historic, distribution. The BTA effect is determined by asking respondents a series of questions. These questions are designed to elicit the respondents' perception concerning their certain skill level in relation to some benchmark. For example, Svenson (1981) asked subjects compare their driving skills to the skills of other drivers. Then these perceptions were analyzed.

How reasonable is it to expect overconfidence among farmers? The BTA effect and optimism are found in individuals in various occupations. Their presence and degree do not appear to depend on the specific occupation. However the miscalibration is a different case. The extent of miscalibration varies among professions. Miscalibration is low when three conditions are satisfied: high predictability, repetitive simple tasks, and clear and fast feedback (Gervais, Heaton, and Odean, 2002). This is why meteorologists, bridge players, race track bettors, and handicapped people tend to be well calibrated. On the other hand, managers making a capital investment will not be well calibrated because the feedback is slow and noisy (Gervais, Heaton, and Odean, 2002). In terms of possible miscalibration, farming as a profession should be somewhere between weather forecasting and capital investment decisions. Farming does not meet all the criteria listed by Gervais, Heaton, and Odean for a farmer to be well calibrated. The predictability of harvest is low, and the yield is random. While the feedback is available, it tends to be noisy and distant in time. The weather and technology are responsible for most of the noise. Also, while farming tasks are repetitive, changes in the crops, changes in the planting practices, etc, may alter the routine and distort feedback. In addition, some of the decisions farmers make are complicated, which could further obscure learning and lead to overconfidence bias in the farmers' judgments. There is empirical evidence that suggest presence of overconfidence. Eales et al. (1990) analyzed whether futures and options prices reflect the subjective distribution of market participants. They found that most of times futures and options price reasonably approximate expected price. However, the implied volatilities tend to overestimate subjective estimates of the volatility. They concluded that this overestimation indicated presence of overconfidence.

What are possible consequences of these biases? Overconfidence could reduce the variability of the subjective probability distribution and possibly negatively skewed. This will make the insurance rate appear overpriced to a farmer. The BTA effect may cause a farmer to perceive himself as more skillful. This in turn may cause him to think that he does not need the insurance at all. Also, if a farmer is overly optimistic about the future, he may think that a natural disaster will not happened, even if this is not confirmed by the past. Because the insurance provides a protection against natural disaster, such thinking may cause a farmer to perceive the insurance as unnecessary. Arguing about possible effects of overconfidence, Alba and Hutchinson (2000) noted that the existence of overconfidence “lowers vigilance toward risks of hazardous consumption, creates inappropriate expectations regarding the likelihood of engaging in successful preventative behavior…, or suppresses contingency planning.” In crop insurance case, overconfidence could be responsible for the farmers’ unwillingness to participate in the insurance programs.

In agricultural economics, most of the related research concentrated on the validity and reliability of subjective data (for detailed overview see Nerlove and Bessler, 2001). Only a few references can be located that analyze the relationship between producers’ perceptions and insurance and the research remains limited in that area. Buzby et al. (1994) analyzed discrepancies between subjective and historical yield distributions for Kentucky farmers. They found that a correspondence existed between the means of the two distributions, but farmers were inclined to overestimate their yield and underestimate their risk. Pease et al. (1993) compared forecasts of crop yields with subjective estimates of the farmers. They found that farmers expected yields to be greater than what forecasted models predicted. Sherrick (2002) found systematic discrepancies between actual and subjective beliefs based on the long-term historic weather data; he argued that these discrepancies may have serious consequences on insurance valuation. Bessler (1980) analyzed whether the aggregated elicited yield probability distribution from individual farmers can be represented by corresponding historical yield data. He found that ARIMA representation of historical yield was a reasonable approximation for expected values of the subjective distribution, but it did not performed well for higher moments. While all of the studies examined discrepancies between subjective and historical yield distributions, none of them attempted to view these differences in light of the characteristics of farms and their owners. Also, no attempt seemed to be made to classify any deviations found and provide ways to correct these deviations.

Crop Insurance

Because reasons to participate in the program are varied and complex, different approaches have been undertaken in the literature to explain farmer unwillingness to purchase crop insurance. Hoping to explain the farmers' lack of interest in MPCI through demand for insurance, researchers turn to finding appropriate demand variables and testing demand models. To date, extensive work has been done up to the date. Goodwin (1993), using Iowa county level corn data, analyzed demand for insurance and found that premia, past year yield, rental to tenancy ratio, land values, farm size, percentage of land in corporative farming, and the interaction term between premium and risk are significant variables that explain demand. Coble et al. (1996) using Kansas farm level wheat data reported that significant variables are expected return to insurance, variance of expected return to insurance, expected market return, variance of expected market return, farm net worth, and wheat acres. Smith and Baquet (1996) using a survey from Montana wheat growers studied demand for the MPCI insurance. Using several models they found that yield variability, premium rates, presence of debt, and level of education explain demand for MPCI. Sherrick et al. (2004) used survey data from farmers in Illinois, Iowa, and Indiana, to determine variables that could describe demand for insurance. They found that farm size, age, debt to asset ratio, tenure, yield, importance of risk management, and probability of receiving an indemnity significantly influence insurance purchase. Makki and Somwaru (2001) analyzed time series farm level data from Iowa farms to determine important variables in demand for crop insurance. They found that insurance choice depends on risk proxies, cost of insurance, and premium subsidy.

Another approach evident in the research literature is to explain a lack of interest in MPCI by analyzing interactions between insurance and other risk management alternatives that are available to farmers (such as hedging, and self insurance). The major argument is if a farmer has better alternatives than insurance he may not be interested in MPCI. This can explain lack of interest in MPCI. For example, Mahul and Wright (2003) analyzed interactions between hedging and revenue insurance and found that futures and crop yield insurance are complements but futures and crop revenue insurance are substitutes. Coble et al. (2003) assessed relationships between various insurance design and options. They found that yield insurance and forward pricing are compliments while revenue insurance and forward pricings are substitutes. Mahul (2003) found that under imperfect estimators of yield and/or price, yield and revenue insurance cannot provide adequate coverage alone and so may include other risk management tools such as revenue options and futures and also combinations.

Another reason that is often mentioned as an explanation for farmer reluctance to purchase MPCI in the literature is the expectation of ad hoc government disaster relief payments. If a farmer expects the government to provide disaster payments then he/she will not purchase insurance. Policy makers seem to understand this because numerous government reports assert that the provision of federal aid will decrease farmer participation (GAO PAD-80-39, GAO RCED-88-211, GAO RCED-89-63, GAO RCED-89-211, GAO RCED-90-37). Also, there is empirical evidence that confirms the point (van Asseldonk 2002) and arguments from researchers (Skees 1999, 2001). While provision of disaster relief does undermine demand for insurance, this argument is somewhat weakened by increased farmer participation in later years. If a farmer knows that the government will provide aid, farmer participation should decrease over time, yet this has not happened. More research is needed in this area to be able to address this issue in detail.

Flood and Earthquake Insurance

Important implications can be derived from studies conducted on other insurances, such as flood and earthquake insurance. Kunreuther et al. (1978) provide an extensive assessment of factors that motivate individuals to purchase (or not to purchase) flood and earthquake insurance. Using lab studies they concluded that individuals tend to treat low probability events (such as flood, or earthquake) as if these events have zero probability of occurrence. Because humans face various important issues, they prioritize. Kunreuther et al. (1978) hypothesize that to be important for consideration, an event should exceed some probability threshold level (individual for each person). Thus, low probability events often are not considered because they fail to exceed the threshold level. Kunreuther et al. (1978) consider two models, expected utility and sequential choice models, and conclude that expected utility is not an adequate model to explain insurance purchasing decisions. Kunreuther et al. (1978) also analyzes how various factors differ between insured and uninsured. Using a willingness to pay approach, they found that 27% of uninsured are willing to pay current premiums, but are unaware how much premiums are. Also, the insured expect higher damages in the future. The majority of insured reported higher probabilities of disaster. Also the majority of insured experienced disaster in the past. They displayed higher risk aversion than the uninsured and are more likely to adopt protective measures against floods. Surprisingly, the majority of uninsured indicated no expectation of federal disaster aid, but the number decreases (from 75 to 61%) as the amount of damages increases. Interpersonal communication turned out to be important factor; insured people are more likely to know someone who has purchased the policy, or have talked to somebody about purchasing insurance. Socioecomic characteristics (such as income, education, etc) turned out to be significant.

Theoretical Model

The model used here is adopted from Glaser and Weber (2004). Consider a farmer who is trying to forecast a yield $\tilde{y}$ for the next year. Assume the yield is normally distributed $\tilde{y} \sim N(\mu_{\tilde{y}}, \sigma_{\tilde{y}}^2)$. The farmer receives signal $\tilde{s}$ about $\tilde{y}$ in the form $\tilde{s} = \tilde{y} + c \cdot \tilde{e}$ where $\tilde{e} \sim N(0, \sigma_{\tilde{e}}^2)$ and $c \in [0, \infty)$. The signal contains a parameter c that indicates the degree of overconfidence. If c=1 the farmer is rational. If 0<c<1 the farmer is variance overconfident. If c>1 the farmer variance underconfident. Following Glaser and Weber (2004) conditional mean and variance are derived (assuming that $\tilde{y}$ and $\tilde{e}$ are independent):

$$E[\tilde{y} \mid \tilde{s} = s] = E[\tilde{y}] + \frac{Cov[\tilde{y}, \tilde{s}]}{Var[\tilde{s}]}(s - E[\tilde{s}]) = \frac{\sigma^2_{\tilde{y}}}{\sigma^2_{\tilde{y}} + c^2 \cdot \sigma^2_{\tilde{e}}} \cdot s \qquad (1)$$

$$Var[\tilde{y} \mid \tilde{s} = s] = Var[\tilde{y}] - \frac{(Cov[\tilde{y}, \tilde{s}])^2}{Var[\tilde{s}]} = \sigma^2_{\tilde{y}} + \frac{\sigma^4_{\tilde{y}}}{\sigma^2_{\tilde{y}} + c^2 \cdot \sigma^2_{\tilde{e}}} \qquad (2)$$

It can be seen from equation 1 and 2 that the mean and the variance of the yield contain the parameter c. The argument is made here that the magnitude of the parameter may determine the insurance purchasing decisions. For example, overconfident producers will not purchase the insurance and underconfident producers will. To consider all possible combinations of the parameters with subsequent decisions, table 1 is constructed.

Proposed variables and their relationship

Several variables will be utilized to systematically analyze the presence of overconfidence. These variables have been broken into two parts: individual and farm characteristics.

Farm-Level Characteristics

In this section, the possible effects of various farm characteristics on overconfidence are analyzed. Research has been conducted in the past analyzing overconfidence of the entrepreneurs and their decisions about a possible business failure and market entry (Camerer and Lavollo, 1999). However, the analysis has not been extended to the firm characteristics. The theory on overconfidence is generally silent about possible effects of the various business aspects on overconfidence. This is because by definition, overconfidence is a characteristic that pertains to the individuals, and not to the companies. However, it is reasonable to expect that certain farm characteristics will affect risk perceptions of owners/individuals. This is why several characteristics were included.

In this paper looks at the three aspects of the farm that could impact overconfidence. These are the size of the farm, debt to asset ratio, and diversification. The paper includes these characteristics because each of them is likely to affect overconfidence. For example, farmers of large, well-diversified farm are more likely to be overconfident. To measure the impact of size on overconfidence, size intervals have been developed. The farms have been assigned to the intervals according to their size. The relationship between size and overconfidence will be established empirically.

A level of diversification is likely to influence overconfidence. The survey contained several questions designed to assess the level of the diversification. Examples are percentage of sales from livestock, various crops grown, number of separate farm locations, and off-farm income. The potential effect of the relationship between the miscalibration, BTA effect, and the diversification will be established empirically.

The impact of the risk exposure will be analyzed as well. The exposure to risk is measured by farmers' debt to asset values. This analysis will allow assessing the possible effect of various levels of debt to asset ratio on overconfidence.

Individual Characteristics

The relationship between various individual characteristics and overconfidence has been studied extensively. There is an empirical evidence that suggests overconfidence depends on gender (Biasis et al. 2004, Barber and Odean, 2001), age (Kovalchik et al. 2003), experience (Gervais, Heaton, and Odean 2002, Brozynski et al. 2004) intelligence (Biasis et al. 2004), and risk aversion (Brozynski et al. 2004). Four individual characteristics have been identified: age, education, experience, and risk aversion.

The level of education is expected to influence overconfidence. While no studies directly look at the level of education, several of them considered intelligence in their analysis. Because it is reasonable to expect the intelligence to be correlated with a level of education, the results from these studies indicate a potential relationship between overconfidence and the level of education. Biasis et.al. 2004 found no relationship between a proxy for overconfidence and intelligence. Gervais, Heaton, and Odean (2002) argued that the intelligence and the BTA effect are positively correlated.

A degree of risk aversion is the next vital measure. Surprisingly, current literature on overconfidence seems to ignore risk aversion and a possible conflict between overconfidence and risk aversion (Alba and Hutchinson 2000). Overconfidence and risk aversion operate in opposite directions. A negative relationship is expected between risk aversion and the BTA effect. The relationship between the miscalibration and risk aversion is also expected to be negative.

The impact of experience on overconfidence is well researched. However the findings are usually contradictory. For example, Gervais, Heaton, and Odean (2002) reported that the managers with successful carriers are more likely to be overconfident. Brozynski et.al. (2004) found that the BTA effect increases with experience and the miscalibration decreases with the experience. Heath and Tversky (1991) argued that the experts are more likely to be overconfident. Locke and Mann (2001) provided evidence that the investors tend to be less overconfident as their experience increases. It is possible that the past research measured different aspects of overconfidence. Because they are not necessarily correlated, it is reasonable for the results to contradict each other. It is reasonable to expect that as a farmer becomes more experienced his/her subjective yield distribution approaches the objective distribution. So the incongruence between the subjective and the objective distribution should decrease as experience increases. This should lead to the negative relationship between miscalibration and experience. Also, as the experience increases, the BTA effect is likely to increase as well.

The relationship between overconfidence and age is not as well researched. Kovalchik et.al. (2003) compared overconfidence between two groups. One group had an average age of 20 and another had an average age of 82. They found that miscalibration is present in both categories, but older individuals tend to be slightly better calibrated. Age is likely to be correlated with experience, so the relationship between overconfidence and age is expected to be similar to the relationship of overconfidence and experience. To measure this effect, the farmers will be grouped into several categories, based on the appropriate age.

Methods

Measures

The survey allows us to assess two components of overconfidence: miscalibration and the BTA effect. Due to the above mentioned problem with an indirect measurement of overconfidence (i.e. proxy specification), the miscalibration and the BTA effect were assessed directly. To measure the miscalibration this paper elicited a subjective probability of yields. The shape of the calibration function (thus the congruence between subjective and objective functions) will illustrate whether miscalibration is present. To measure the BTA effect this paper asked questions related to the farmers yield perceptions. In particular, the farmers were asked to indicate whether their mean yield level is higher, same, or lower in comparison with the county average, and whether their yield variability level is greater, identical, or less variable in comparison to the county's variability. In essence, the BTA effect is decomposed in 2 parts: the mean BTA effect and the variability BTA effect. In the absence of the BTA effect, it is reasonable to expect the majority of the farmers to view their yield mean and variability as being average. Besides the information on the measures of overconfidence, detailed personal information is available. This will allow analyzing these two biases in terms of several farm and individual characteristics.

Calibration

The calibration describes the correspondence between two different distributions. In statistical literature this method is known as a q-q plot (see for example Law and Kelton, 1991). A detailed description of the calibration process can be found in Bunn (1984), Curtis et al. (1985). Curtis et al. (1985) notation is adopted here. Consider the variable V, (for simplicity it is assumed that V distributed normally). The variable can be standardized

$$X = \frac{(V - \mu)}{S} \quad (1)$$

where

μ = mean of the objective distribution

S = standard deviation of the objective distribution

The distribution function $\Phi(x)$ can be used to represent the variable X. The subjective values of V are also transformed

$$X_T = \frac{(T - \mu\ )}{S} \quad (2)$$

The distribution function $F_T(x)$ can be used to represent the variable X. The calibration curve is the curve that relates $F_T(x)$ and $\Phi(x)$. It is a plot of $F_T(x) = p$ versus $\Phi_S(x) = r$, or more precisely, $p(r) = F_T(\Phi_S^{-1}(r))$. The resulting curve can be influenced by parameters of the distribution; in this case it is the standard deviation and mean of F_T. Several curves displayed in figure 1, reflect different possible shapes of the calibration curve. Curve C reflects a perfectly calibrated subjective c.d.f., so μ_T =0, S_T =1, and F_T is normal. The shape implies that the individual's assessment of the objective distribution is completely correct. Curve A illustrates the case when μ_T >0, and S_T =1, where the assessor overestimated the mean, but correctly estimated the standard deviation. Curve B shows the curve when μ_T =0 but S_T <1, where the assessor correctly predicted the mean, but underestimated the standard deviation. Curve D illustrates the curve when μ_T =0 but S_T >1, where the assessor overestimated the standard deviation. Curve E shows the curve for the cases where μ_T <0, and S_T =1, the overestimated mean and the correctly estimated standard deviation. Also, it is possible to have both incorrectly estimated mean and variance. Each of these cases is a representation of the miscalibrated assessment and an indication of the potential bias. If overconfidence is present in farmer's decision making, calibration curve should look like B in figure 2. If no overconfidence is present then calibration curve should look like C.

Data

Survey description and parameterization of the crop distributions

The study utilized a crop yield risk survey (CYRS). The survey was conducted under a cooperative agreement with Economic Research Service USDA and supported by Risk Management Agency of USDA. Copy of the survey is included in the appendix. Barry et al. (2002) provides following description of the survey: “Progressive Farmer – a company that communicates extensively with agricultural producers through farm magazines, surveys, and other means sold a comprehensive mailing list of farmers, together with selected demographic characteristics. The geographic scope of the survey included farmers in Illinois, Indiana, and Iowa. These states represent a relatively homogeneous portion of Midwestern U.S. agriculture, while still providing significant diversity in soil quality, levels and variability of crop yields, and crop and livestock enterprises. Progressive Farmer used random sampling of farms with at least 100 acres for the three state regions to compile a mailing list of 3000 farms. Their anticipated rate was in the 15-20% range. The 3000 total was selected together with the anticipated response rate, to yield a statistically reliable database for subsequent analysis. As a part of survey development process, two focus groups of farmers were held in December 2000 to provide information for survey formulation. The survey was also reviewed by other University personnel and economist with Economic Research Service of USDA. It was then pretested with asset of farmers and a crop insurance agent. The extensive and informative feedback from these activities contributed importantly to financing the content of the survey. The survey was mailed in early March, 2001 with a request for farmers to return the completed questionnaire within a 10-day period. A cover letter accompanying the survey explained the purpose, ensured confidentiality, provided directions for survey completion, and identified a source for inquiries if questions arose.

Included in the survey was an honor payment check for $3.00 which was to be cashed only upon completion and return of the survey. A second mailing of the survey occurred three weeks later to stimulate further responses.

The survey form contains several sections, including demographic and business information, risk management information, risk attributes and perceptions, the conjoint ranking of insurance products and attributes, and related information (see the complete survey form in Appendix). The questions are a mixture of Likert rankings, fill-in-the-blank, and box-checking. Some open-ended questions are provided at the end of the survey form.

Demographic and business characteristics addressed in the survey included state and county location, farm size, tenure position, enterprise combinations, age and experience, education, business organization, off-farm income and financial structure. The risk management section sought to determine the farmers' use and importance associated with asset of risk management options in marketing, insurance, financing, and production. Degrees of familiarity and anticipated use of various crop insurance products were indicated. Similarly, the farms rated the importance of various sources of information about crop insurance. The survey section on risk attributes and perceptions addressed information about farmers' levels and variability of crop yields, yield histories, and subjective probability distributions for corn and soybean yields. The conjoint section of the survey elicited farmers' preferences fore eight separate combinations of insurance product attributes. Other survey questions addressed the farmers' responses to additional insurance characteristics, and sought open ended responses about insurance premia improvements in crop insurance programs, and other comments and observations.

A total of 926 surveys were returned. Of these, 896 were deemed sufficiently complete to be usable, resulting in an overall usable response rate of approximately 29%. In general, the survey rate was well above the anticipated total response rate of 15% to 20%."

One of the reviewers in the earlier revisions of draft raised legitimate concern regarding potential sample selection bias citing survey's response rate. To assess the degree of the bias it was suggested to compare other than yield sample variables (such as age, education) to state averages. Table 2 compares age and education of survey data to state averages. It indicates that farmers in the sample are more educated and older. The fact that farmers in the sample differ from underlying population suggests presence of the sample selection bias. The severity of the bias and possible ways to correct for it will be subject of future research.

Part of the survey was designed to elicit a subjective probability distribution for the crop. The conviction weights approach was utilized (Cramer and Norris 1994) to elicit the subjective probability distribution. This approach asks the respondent to assign probabilities to the intervals specified for the variable of interest. Using these probabilities, both the cumulative and the probability functions can be constructed. The survey also contained internal checks to insure that subjects are consistent in their reporting of the probabilities. For example, the survey later contained two questions, each asking to supply the best estimate of getting an indemnity under 50% and 85% of APH for each crop.

Yields were approximated by Weibull distribution. Sherrick et.al. (2004) suggested several useful properties of the Weibull distribution for modeling crop yields including its non-symmetry, zero limit, and wide range of skewness and kurtosis. The PDF and CDF of the Weibull have the following functional forms:

$$f(x) = \frac{\gamma}{x}\left(\frac{x}{\alpha}\right)^{\gamma} e^{-\left(\frac{x}{\alpha}\right)^{\gamma}} \quad (3)$$

$$F(x) = 1 - e^{-\left(\frac{x}{\alpha}\right)^{\gamma}} \quad (4)$$

The parameters for each farmer's subjective distribution were estimated assuming the Weibull distribution using nonlinear least squares between implied and tabulated response quantiles. The parameters were calculated in Excel.

A similar procedure was performed to obtain historic (objective) yield distributions. The yield levels for each county were obtained from NASS for the period ranging from 1972 to 2002. The yields were detrended using a simple linear time trend. The simple linear trend was used because past research has indicated that yield data are stationary (i.e. do not contain unit root) (Sherrick et.al. 2004). The detrended average mean and standard deviation were obtained for each county from the detrended yields. The estimates were then transformed to the farm level. The farm yield levels are on average 1.4 times more variable than county levels. This multiplier was used in transforming county yield data. The parameters for the objective Weibull distribution were estimated using maximum likelihood. Excel Solver was utilized for this procedure as well. Also, while calibration can be done non-parametrically, this paper utilizes parametric calibration. This is because the distribution was assessed in intervals, so to construct entire distribution a parametric approach was needed.

Characteristics of Data

Tables 3 and 4 present basic statistics for the data. The majority of responses came from Iowa and Illinois. The mean for an average size farm is 757. The major crops are corn and soybeans. An average farmer is 54 years old and has been farming for 31 years. The majority of the farms carry debt. Table 4 shows perceptions of average yield and its variability. These perceptions are utilized for the BTA effect assessment. In line of behavioral finance findings, the table demonstrates the existence of the BTA effect, because only 6-7% of farmers admit that their yields are lower than their county average, and only 14-15% admit that their yields are more risky than the county average. Table 5 illustrates what risk management options farmers employ and their importance. Most of them view government programs, seed varieties, and financial savings as major risk management tools. Crop insurance ranks only 7th and 8th in terms of its importance and use.

Preliminary Results and Conclusion

This section presents and discusses results. Results are for Illinois, sample size is 224, and the sample includes only corn growers. The section presents selected tables. The tables for the remaining variables specified in the analytical model (such as age, diversification, etc) are not included because they were inconclusive and statistically insignificant. To assess significance between the relationships a chi squared test is conducted. If results are significant the significance noted below the table. Because the results shown are only for Illinois and only for the corn producers, the analysis is incomplete. Thus, because the results are incomplete, the findings should be treated with caution.

Table 6 presents the total number of overconfident and underconfident farmers. In general, farmers are overconfident; 62% displayed overconfidence. Table 7 presents the relationship between farm size and miscalibration. The table displays no relationship between miscalibration and overconfidence; the proportions are not significantly different. Table 8 shows the relationship between the mean BTA effect and the size of the farm. There is positive and statistically significant relationship between the mean BTA effect and size of the farm. Table 9 shows the relationship between the variability BTA effect and size of the farm. The results are significant, but the relationship is inconclusive. It seems that below average variability decreases with farm size.

Table 10 presents the relationship between education and miscalibration. The proportion of overconfident farmers decreases as schooling increases. Schooling has negative and statistically significant impact on the miscalibration. Table 11 shows the relationship between the mean BTA effect and the level of education. The above average mean proportion is the highest for the college educated and the lowest for the high school graduates. Table 12 displays the relationship between the variability BTA effect and education. The relationship is inconclusive.

In general, the relationship between miscalibration and experience is inconclusive. The relationship between the mean BTA effect and experience is positive, but the results are statistically insignificant. The relationship between the variability BTA effect and experience is negative; the results are insignificant as well.

The relationship between the use of insurance and miscalibration does not show the hypothesized relationship, i.e. the proportions between users and non users are the same. The relationship between the mean and the variability BTA effect does not confirm the theory as well. There seems no relationship between use of insurance and overconfidence. However, the results are statistically insignificant.

Because the results are incomplete it is too early to draw conclusions. In the near future, this paper planes to extend analysis to other states. In addition, this paper planes to employ discrete regression model to assess the significance and the direction (measured by sign of the coefficient) of the relationship between the components of overconfidence and various characteristics of the farms and their owners. Also, to further enrich the analysis the premia for the insurance will be calculated utilizing subjective yield distributions. It is expected that overconfident farmers will be willing to pay less for the insurance. As this paper addes more data from other states, and employ other statistical tools, a clearer picture should emerge about the nature and extent of overconfidence among farmers.

Appendix

Figure 1. Different Shapes of Calibration Curve

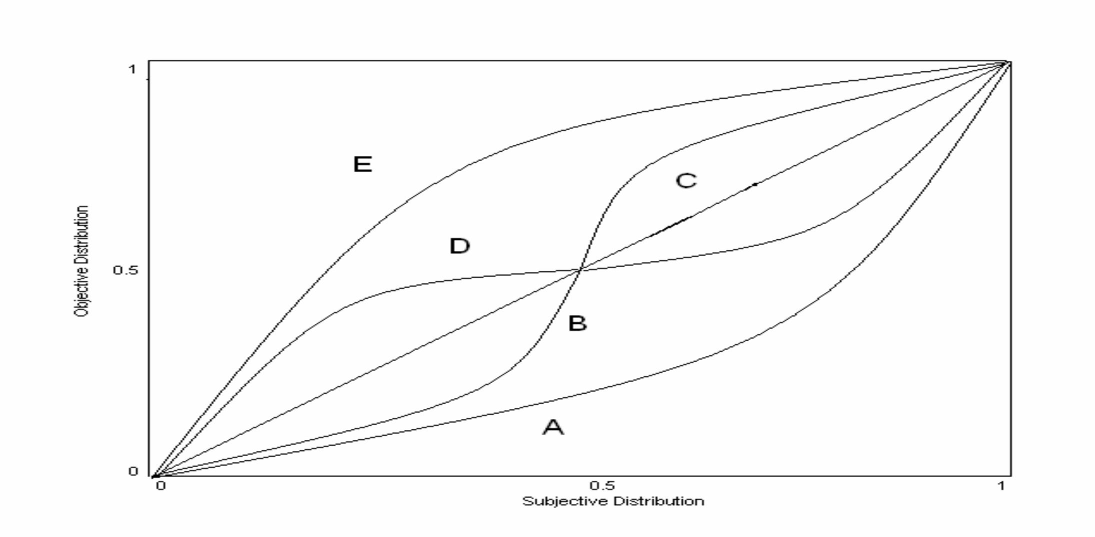

Table 1. Insurance purchase decisions

Overconfidence	Purchasing Decision
c = 0	No purchase
0< c <1	No purchase
c = 1	Purchase
c > 1	Purchase

Table 2. Comparison between survey data and ARMS survey.

	Survey Data	**ARMS Data (1996, Heartland Region, Corn Producers)**
	Education	
High School	45%	56%
Some College	27%	28%
College Graduate or Higher	28%	16%
	Age	
Less than 50	40%	51%
50-64	25%	32%
64 and older	35%	16%

Table 3. Farmer Characteristics

	Units	Percent or Average	Std. Dev.
Farms located in			
Iowa	farms	411	
Indiana	farms	117	
Illinois	farms	342	
Tillable acres	acres	757	940
Percent of farmland in:			
Corn	percent acres	49.22%	11.70%
Soybeans	percent acres	44.23%	12.47%
Wheat	percent acres	1.73%	5.48%
Other	percent acres	4.82%	13.63%
No. of separate farm locations	number	4.76	4.63
No. of years farming	years	31	13
Age (as of 1/1/2001)	years	54	13
Highest formal education			
High School	farmers	360	
Some College	farmers	217	
College Graduate	farmers	192	
Graduate School	farmers	38	
No response	farmers	65	
Farms with farm debt	farmers	554	
Debt-to-asset ratio			
0 to .20	farmers	249	
.21 to .40	farmers	208	
.41 to .60	farmers	102	
.61 to .80	farmers	24	
.81 and higher	farmers	4	

Table 4. Risk Attitudes and Perceptions

	-- responses --	
1. Perceptions of ave. yield	corn	soybeans
Higher yield than county average	487	443
Lower yield than county average	54	57
About the same yield as county average	290	303
2. Perception of yield riskiness		
More stable than county average	375	360
More variable than county average	127	119
Same variability as county	328	330

Table 5. Use and Importance of Risk Management Options

		Farms using	Average Score
j	Government programs	173	5.98
I	Multiple seed varieties	324	5.34
g	Financial savings/reserves	281	5.19
h	Spread crop sales over time	274	5.18
n	Forward contracting	141	4.84
b	Multiple crop enterprises	227	4.80
d	Crop revenue insurance	272	4.69
c	Crop yield insurance	425	4.45
f	Crop share leases	446	4.41
k	Farm in multiple locations	536	4.32
l	Production/marketing contracts	327	4.07
m	Back-up credit lines	157	3.88
a	Hedging/options	94	3.68
e	Catastrophic insurance (CAT)	333	3.30
o	Irrigation	28	2.23

Table 6. Number of overconfident and underconfident farmers

	Number of Farmers	Percentage
Variance Overconfidence	139	62%
Variance Underconfidence	85	38%

Table 7. Relationship between miscalibration and size of the farm

	Large Farms	Intermediate Farms	Small Farms
Variance Overconfidence	61%	56%	61%
Variance Underconfidence	39%	44%	39%

Table 8. Relationship between BTA effect and size of the farm

	Large Farms	Intermediate Farms	Small Farms
Above Average Mean	77%	52%	55%
Below Average Mean	2%	12%	11%
Average Mean	21%	36%	34%

Results are significant at 1% level

Table 9. Relationship between BTA effect and size of the farm

	Large Farms	Intermediate Farms	Small Farms
Above Average Variability	47%	46%	52%
Below Average Variability	10%	19%	15%
Average Variability	43%	36%	34%

Results are significant at 5% level

Table 10. Relationship between miscalibration and level of education

	High School	Some College	College	Graduate Degree
Variance Overconfidence	71%	64%	48%	50%
Variance Underconfidence	29%	36%	52%	50%

Results are significant at 5% level

Table 11. Relationship between BTA effect and level of education

	High School	Some College	College	Graduate Degree
Above Average Mean	58%	59%	71%	64%
Below Average Mean	10%	5%	13%	0%
Average Mean	33%	36%	15%	36%

Table 12. Relationship between BTA effect and level of education

	High School	Some College	College	Graduate Degree
Above Average Variability	45%	52%	52%	36%
Below Average Variability	14%	20%	8%	14%
Average Variability	41%	29%	40%	50%

Survey

Crop Insurance Survey

Your responses will help improve Federal Crop Insurance programs.

A. **Please tell us about yourself and your operation**

1. Location *(circle state)* *Iowa* *Indiana* *Illinois*

   Primary County or Counties ____________________

2. Number of tillable acres farmed __________ *acres*

3. Number of acres

   a. owned . . . . . __________ acres
   b. share rented __________ acres
   c. cash rented . __________ acres
   d. other . . . . __________ acres

4. Typical fraction of total farmed crop acres in

   a. corn . . . . __________%
   b. beans . . . . __________%
   c. wheat . . . . __________%
   d. others (list) ____________________ . . __________%
   (Should add to 100%)

5. a. Number of separate farm locations . . . . __________
   b. Number of different landlords (if any land rented) . __________

6. Percentage of annual gross farm sales from livestock . . . ______%

7. Which of the following non-crop enterprises are part of your farm business? (*Check all that apply*)

   ☐ a. Farrow-to-finish in which you own the hogs
   ☐ b. Produce feeder pigs -- you own the sows
   ☐ c. Finish out feeder pigs – you own the pigs
   ☐ d. Raise hogs on contract
   ☐ e. Beef feeding
   ☐ f. Cow-calf beef operation
   ☐ g. Finish out feeder cattle
   ☐ h. Dairy
   ☐ i. Custom work
   ☐ j. Other (please specify) ____________________

8. a. Number of years in farming . . . . __________ yrs.

b. Age as of 2/01/01 . . . . __________ yrs.

9. Highest formal educational attainment *(check box)*

- ☐ a. High School
- ☐ b. Some college/professional training
- ☐ c. College graduate
- ☐ d. Graduate school

10. In the next five years, do you expect tillable acres in your crop enterprise to: *(check box)*

- ☐ a. Increase significantly
- ☐ b. Increase slightly
- ☐ c. Remain about the same
- ☐ d. Decrease

11. Do you or your spouse have off-farm income? (*Check appropriate box*)

	No	Yes: $0 to $5,000	$5,000 to $50,000	Over $50,000 annually
a. self	☐	☐	☐	☐
b. spouse	☐	☐	☐	☐

12. My farm is a: (*Check appropriate box*)

- ☐ a. Sole proprietorship
- ☐ b. Partnership (No. of partners) __________
- ☐ c. Corporation

13. Do you currently have any farm loans? *(Check appropriate box)*

- ☐ a. Yes
- ☐ b. No *(go to next page)*

14. Debt-to-asset ratio for your farm business (*Check appropriate box*)

- ☐ a. 0 to .20 (less than 20% debt)
- ☐ b. .21 - .40
- ☐ c. .41 - .60
- ☐ d. .61 - .80
- ☐ e. above .80 (more than 80% debt)

********** *All Information remains confidential* **********

B. *Risk management information*

1. For Risk Management Options listed below, indicate how **important** you believe each item to be in terms of risk management on a typical farm by circling a number. Then, mark an "X" in left column if **you use** this to manage risk in **your** operation.

	X if used	Risk Management Option	Not important						Very important
a.		Hedging/options	1	2	3	4	5	6	7
b.		Multiple crop enterprises	1	2	3	4	5	6	7
c.		Crop yield insurance	1	2	3	4	5	6	7
d.		Crop revenue insurance	1	2	3	4	5	6	7
e.		Catastrophic Insurance (CAT)	1	2	3	4	5	6	7
f.		Crop share leases	1	2	3	4	5	6	7
g.		Financial savings/reserves	1	2	3	4	5	6	7
h.		Spread crop sales over time	1	2	3	4	5	6	7
i.		Multiple seed varieties	1	2	3	4	5	6	7
j.		Government programs	1	2	3	4	5	6	7
k.		Farm in multiple locations	1	2	3	4	5	6	7
l.		Production/marketing contracts	1	2	3	4	5	6	7
m.		Back-up credit lines	1	2	3	4	5	6	7
n.		Forward contracting	1	2	3	4	5	6	7
0.		Irrigation	1	2	3	4	5	6	7

2. Please rate your familiarity with each crop insurance product. *(Circle the most appropriate response)*

		Not familiar						Very familiar
a.	Catastrophic (CAT)	1	2	3	4	5	6	7
b.	Actual production history (APH & MPCI)	1	2	3	4	5	6	7
c.	Crop revenue coverage (CRC)	1	2	3	4	5	6	7
d.	Income protection (IP)	1	2	3	4	5	6	7
e.	Revenue assurance (RA)	1	2	3	4	5	6	7
f.	Group risk plan (GRP)	1	2	3	4	5	6	7
g.	Group risk income plan (GRIP)	1	2	3	4	5	6	7

********** *All Information remains confidential* **********

3. Indicate the expected total number of acres on which you intend to buy some form of crop yield or revenue insurance in 2001 . . . . _______ acres

Fill in the approximate acreage by type:

	Insurance type	Corn acres	Soybean acres
a.	Multi-Peril Crop Insurance (MPCI) or Actual Production History (APH)		
b.	Crop Revenue Coverage (CRC)		
c.	Income Protection (IP)		
d.	Group Risk Plan (GRP)		
e.	Group Risk Income Protection (GRIP)		
f.	Revenue Assurance (RA)		
g.	Hail		
h.	Wind/Green snap		
i.	No Insurance		

4. Rate the importance of the following sources for information about crop insurance? (*Circle the most appropriate response*)

	Source of information	Not important						Very important
a.	Crop insurance agent	1	2	3	4	5	6	7
b.	Popular press	1	2	3	4	5	6	7
c.	Lender	1	2	3	4	5	6	7
d.	USDA - Risk Management Agency	1	2	3	4	5	6	7
e.	Extension/University sources	1	2	3	4	5	6	7
f.	Input supplier	1	2	3	4	5	6	7
g.	Farm organization	1	2	3	4	5	6	7
h.	Landlord	1	2	3	4	5	6	7
i.	Farm Manager or Consultant	1	2	3	4	5	6	7
j.	Other farmers	1	2	3	4	5	6	7
k.	Other (list)_______________	1	2	3	4	5	6	7

********** *All Information remains confidential* **********

C. *Risk attributes and perceptions*

1. Relative to your primary county's average yield, would you say your average yield is: *(Check the appropriate box, fill in blank)*

Corn:
- ☐ a. higher, by ________ bu/acres
- ☐ b. lower, by ________ bu/acres
- ☐ c. about the same

Soybeans:
- ☐ d. higher, by ________ bu/acres
- ☐ e. lower, by ________ bu/acres
- ☐ f. about the same

2. Relative to the same county, would you say your yields are: *(Check the appropriate box)*

Corn:
- ☐ a. more stable
- ☐ b. more variable
- ☐ c. same degree of variability

Soybeans:
- ☐ a. more stable
- ☐ b. more variable
- ☐ c. same degree of variability

3. Percentage of years your corn yield is below the county average?_______ (0% to 100%)

4. Please fill in the blank with your best estimate of the probability of getting an insurance payment under Catastrophic (CAT) coverage? (CAT is equivalent to APH at 50% coverage, so you would receive a payment only if your yield is below **50%** of your APH)

   a. Corn . . . . . . ________ (0% to 100%).

   b. Soybeans . . ________ (0% to 100%).

5. Please fill in the blank with your best estimate of the probability of getting an insurance payment under multi-peril or actual production history crop insurance (APH/MPCI) with an **85%** coverage level? (APH/MPCI would pay in this case if your yield is below 85% of your APH)

   c. Corn . . . . ________ (0% to 100%)

   d. Soybeans . . . ________ (0% to 100%)

********** *All Information remains confidential* **********

6. Please fill in the table with your best estimates of the probability of your yield being in the intervals listed (*for example, 15 times out of 100 is a 15% probability*).

	Corn - Yield range	Probability	Soybeans - Yield range	Probability
a.	Less than 40 bu./acre		Less than 10 bu./acre	
b.	41 to 60 bu./acre		11 to 20 bu./acre	
c.	61 to 80 bu./acre		21 to 30 bu./acre	
d.	81 to 100 bu./acre		31 to 40 bu./acre	
e.	101 to 120 bu/acre		41 to 50 bu./acre	
f.	121 to 140 bu./acre		51 to 60 bu./acre	
g.	141 to 160 bu/acre		61 to 70 bu./acre	
h.	More than 160 bu./acre		More than 70 bu./acre	
	Total (Should sum to 100%)	100 %	Total (Should sum to 100%)	100%

7. Please indicate the highest and lowest yields on your primary farm that you recall and indicate the year if known. If you do not grow a given crop, mark NA.

a. Highest yield . . . . Corn _______(bu/ac) Year ________

b. Lowest yield . . . . Corn _______(bu/ac) Year ________

c. Highest yield . . . . Soybeans _______(bu/ac) Year ________

d. Lowest yield . . . . Soybeans _______(bu/ac) Year ________

e. Highest yield . . . . Wheat _______(bu/ac) Year ________

f. Lowest yield . . . . Wheat _______(bu/ac) Year ________

********** *All Information remains confidential* **********

8. **Ranking Insurance Products:**

This page contains descriptions of 8 separate insurance products. Please order the insurance products from 1 (most preferred) to 8 (least preferred) by placing the numbers 1 to 8 in the boxes. These insurance products differ by (i) whether they insure ***yield*** or ***revenue*** ; (ii) whether they ***do or do not permit unit flexibility*** so that either any designated acres could be insured as a separate policy, or all acres farmed within a county are insured as a single unit; (iii) and whether the coverage level and premium and frequency of payment to the farmer are ***high*** or ***low***.

Insurance:	**Crop revenue insurance**	☐
Units:	**Flexible, any designated acres**	
Features:	**Low coverage** **Low cost** **Low frequency of payment**	

Insurance:	**Crop yield insurance**	☐
Units:	**Inflexible, all acres within county**	
Features:	**Low coverage** **Low cost** **Low frequency of payment**	

Insurance:	**Crop yield insurance**	☐
Units:	**Flexible, any designated acres**	
Features:	**Low coverage** **Low cost** **Low frequency of payment**	

Insurance:	**Crop revenue insurance**	☐
Units:	**Flexible, any designated acres**	
Features:	**High coverage** **High cost** **High frequency of payment**	

Insurance:	**Crop revenue insurance**	☐
Units:	**Inflexible, all acres within county**	
Features:	**Low coverage** **Low cost** **Low frequency of payment**	

Insurance:	**Crop yield insurance**	☐
Units:	**Flexible, any designated acres**	
Features:	**High coverage** **High cost** **High frequency of payment**	

Insurance:	**Crop yield insurance**	☐
Units:	**Inflexible, all acres within county**	
Features:	**High coverage** **High cost** **High frequency of payment**	

Insurance:	**Crop revenue insurance**	☐
Units:	**Inflexible, all acres within county**	
Features:	**High coverage** **High cost** **High frequency of payment**	

(Survey continues on back)

9. Please indicate your degree of agreement with the following statements.

		Strongly disagree						Strongly agree
a.	I try to choose the insurance product that will return the most payments given a per acre premium	1	2	3	4	5	6	7
b.	I view crop insurance as a safety net that should only pay in time of disaster	1	2	3	4	5	6	7
c.	I purchase crop insurance because my lender requires me to	1	2	3	4	5	6	7
d.	I select whatever products my agent recommends	1	2	3	4	5	6	7
e.	Insurance is important because of debt payment obligations	1	2	3	4	5	6	7
f.	Insurance is important due to high cash rent obligations	1	2	3	4	5	6	7
g.	Insurance is not important due to low yield variability on my farm	1	2	3	4	5	6	7
h.	Insurance is not important because I manage risks in other ways	1	2	3	4	5	6	7
i.	Insurance is too complicated to understand and use	1	2	3	4	5	6	7
j.	Per acre premium costs are very important to my decisions	1	2	3	4	5	6	7
k.	Availability of high coverage levels is important to me	1	2	3	4	5	6	7
l.	The ability to insure different acreages separately is important	1	2	3	4	5	6	7
m.	Insurance is not important because the government will cover severe crop losses	1	2	3	4	5	6	7
n.	Insurance is important to cover yield shortfalls when I forward contract	1	2	3	4	5	6	7

10. The cost of insurance would have to have to decrease by ______ %*(please fill in)* for you to substantially increase your use of insurance. How would this change your use of insurance?

____

____

____

11. If you use any crop insurance products, what changes (other than price) would you suggest making to Federal Crop Insurance Programs to improve its usefulness to you?

____

____

____

12. If you don't use crop insurance products, what changes (other than price) would most increase your interest in using crop insurance?

____

____

____

13. Please provide any other comments/observations about Federal Crop Insurance programs.

____

____

____

Thanks!

********** *All Information remains confidential* **********

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