Department of Agricultural Economics

EXTENSION EDUCATORS' SUPPLY OF RISK MANAGEMENT TRAINING TO FARMERS

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Abstract

This paper primary objective is to analyze the supply of risk management education provided by extension educators to their clients. A survey of county/area extension educators from Mississippi, Texas, Indiana, and Nebraska was conducted during the fall of 2001. A Tobit econometric model was constructed to analyze the extension educators' supply of risk management training to farmers. Results showed that the number of risk management education training programs held in the past 3 years by extension educators was positively related to the extension educators' percent of time devoted to agricultural responsibilities, the value of all crops in the extension educator's county/area, the extension educator's previous training on risk management, whether the extension educators held an advanced degree (master or PhD), whether the extension educators perceived themselves as being knowledgeable in risk management techniques, and whether extension educators believe that forward contracts and futures/options strategies result in increased returns for the farmer than selling in the cash market. On the other hand, the number of risk management education training programs held in the past 3 years by extension educators was negatively related to the extension educators' years of experience, whether the extension educators work in Mississippi, the dollar amount of the value of all livestock in the extension educator's county/area, and whether the extension educators perceived farmers as being knowledgeable in risk management techniques.

Keywords

Extension Educator, Risk Management Education, Risk Perceptions.

Extension Educators' Supply of Risk Management Training to Farmers

Risk management is becoming a key issue for farmers and is also receiving significant political attention. Since much of the outreach in this area is delivered through the extension service, there is a need for more research on how extension educators perceive their clients' needs and their own demand for additional training. This will help tailor better risk management educational programs directed toward producers' needs. The Risk Management Agency (RMA) and the Cooperative State Research, Education and Extension Service (CSREES) of the United States Department of Agriculture (USDA) initiated a risk management education competitive grants program during 1998. Continued federal government commitment to risk management is evident in the Agricultural Risk Protection Act of 2000. This legislation provides $10 million annually for fiscal year 2001-2005 to support risk management educational programs. The information reported here is output from one of the surveys conducted by the "Understanding Farmer Risk Management Decision Making and Educational Needs" project (Coble et al.; Patrick et al.; Vergara et al.). Institutions participating in the project are Mississippi State University, Purdue University, University of Nebraska, and Texas A&M University.

Given a continuing emphasis on risk management education, it is important to understand the factors behind the extension educators' decision to supply risk management education. The purpose of this paper is to examine these factors, making use of data obtained through a four-state survey of extension educators.

First, we summarize survey results focusing on the characteristics of the extension educators, their training activities, their perceptions of producers' risk and risk

management, their evaluation of self and producers' risk management knowledge, their interest in risk management education, and finally their evaluation of producers' educational interest on risk management. Second, we present results of a Tobit model examining extension educators' supply of risk management education. We conclude with an analysis of the factors affecting extension educators' risk management education supply and its implications for the farmers' clientele. We believe that the survey report and the econometric analysis are an important contribution in extension education since they provide in-depth analysis of the factors affecting the extension educators' decision to provide additional risk management training, focusing on characteristics of the extension educators that have not been taken into consideration in previous studies. By bringing together the literature on risk management education and extension educator's characteristics, this analysis sheds light on the role that education, experience, risk perceptions, and previous training plays in the extension educators' decision to provide risk management training courses to farmers. This study analyzes the extension educators' provision of risk management training courses. Second, it also investigates the role that advanced education, previous training, and clientele perceptions have on the extension educators' provision of risk management training courses.

Previous Research

Several studies have addressed the issue of extension educators and producers risk perceptions and the implications for training and research (Anderson and Brorsen; Anderson and Mapp; Goodwin and Schroeder; Patrick; Patrick et al.; Selley and Wilson; Schroeder et al.). Anderson and Brorsen, Anderson and Mapp, and Selley and Wilson

have explored agricultural economists' perspectives on a range of issues relating to the effectiveness of risk management educational programs.

Anderson and Mapp conducted interviews with extension economists experienced in risk management education. They found that educators found risk management a challenging topic to "sell" to agricultural producers. Selley and Wilson conducted a national survey of agricultural economists involved in risk management research and extension. Their results also supported Anderson and Mapp's findings regarding economists' perceptions that producers showed limited receptiveness to risk management programs.

Goodwin and Schroeder used data from a 1992 survey of Kansas producers to investigate factors associated with participation in marketing and risk management educational programs, and adoption of forward pricing methods. They found that the probability of attendance increased with education, financial leverage, and diminished risk aversion. It is important to acknowledge that early studies (Anderson and Mapp; Selley and Wilson) have revealed that many extension educators have not found producer audiences receptive to risk management training.

Schroeder et al. offered a side-by-side comparison of producers and extension economist's perceptions of marketing strategies. They found that producers reported a preference for risk reduction strategies, but that extension educators were not always focused on satisfying the producers' demand for more risk management strategies.

Another important body of literature refers to the problems facing extension programs across the country. An observed trend in the U.S. is the reduction of federal funding for extension activities (Knutson and Outlaw). Others focus on the struggle by

extension programs to adapt to changes in the structure of the population, the economy, and the agriculture (Ilvento; Parcell; Hanson). Nevertheless, as Huffman observed, farmers' schooling has a positive effect on farm income primarily from its impact on farm profit and off-farm earnings. Additionally, with the recent changes in farm policies resulting from the new Farm Security and Rural Investment Act of 2002, it is expected that changes in the business environment will increase producers' interest in risk management and therefore motivate extension educators to supply additional risk management training.

Survey Procedure

The county/area extension educator risk management survey was conducted in Mississippi, Texas, Indiana, and Nebraska during the fall of 2001. The collaborating project investigators developed the extension agricultural educator survey questionnaires. This survey targeted primarily extension agents involved in agricultural education. Initial mailings included the survey questionnaire and a cover letter that solicited participation. A second copy of the questionnaire was mailed to all non-respondents after two weeks. A total of 505 surveys were included in the initial mailing: 82 in Mississippi, 81 in Nebraska, 92 in Indiana, and 250 in Texas. Three hundred fifty one questionnaires were returned, for a response rate of 70 percent. Of the returned surveys, 296 are incorporated into the analysis, based on completeness of all pertinent information.

Characteristics of the extension educator

Of the 296 extension educators responding, 49.53 percent are currently working in Texas, followed by 18.21 percent in Indiana, 16.23 percent in Mississippi, and 16.03 percent in Nebraska. Sixty-four percent of the extension educators have at least one

degree in agricultural education, followed by 48 percent having at least one degree in animal science, 25 percent having at least one degree in agronomy, and 17 percent having at least one degree in agricultural economics.

Extension educators in this sample have on average 16 years of experience. Forty-three percent of the extension educators in Mississippi and Indiana have between 0 and 10 years of experience, while extension educators in Nebraska appear to be more experienced with 52 percent of them having above 21 years of experience or more. In Texas the extension educator's years of experience are distributed more evenly across experience categories.

On average, extension educators in this sample devote 73 percent of their time to agriculture related problems. Sixty-six percent of the extension educators in Mississippi spend more than 75 percent of their time devoted to agricultural responsibilities, followed by Texas (47 percent), Nebraska (40 percent), and Indiana (37 percent).

Extension educators were asked to quantify their preferred method of risk management education, and to provide a similar subjective measure of the producers' preferred risk management learning method. A high proportion of the extension educators (87 percent) indicated that their preferred method of risk management education was in depth training by risk management experts.

Extension educators were asked to quantify the producers' preferred risk management learning method. Sixty-five percent of the extension educators agreed that producers would prefer learning risk management through in depth training by risk management experts.

Extension educators were asked to give their opinion with respect to several topics using a Likert-type scale ranging from 1 (disagree) to 5 (agree). Most extension educators in the sample tend to agree with the notion that forward contracting and/or futures strategies will on average result in a higher price than selling in the cash market. Schroeder et al. in a survey of producers and extension economists also observed this finding. Extension educators also tend to agree that the producers' primary marketing goal should be to reduce risks rather than raise net sales price.

Finally, extension educators were asked whether they believed producers had the level of risk management knowledge needed to be effective managers in today's economic environment. Overall, 86 percent replied "no". One of the main objectives of this study will be to use the summary statistics reported here to analyze econometrically the reasons behind this type of responses. It is hoped that this study will produce recommendations that may be useful to improve the extension educators' training of producers in risk management.

Supply of risk management educational training examined

The supply of risk management education by extension educators is a public good in the sense that is often offered free of charge or at highly subsidized rates, and characterized by non-exclusivity and non-rivalry. The risk management educational training supply is a function in which the output depends on the customers (farmers) as inputs. The presence of other recipients of risk management training often contributes to the quality of the output experienced by each farmer who is recipient of training. Therefore the price (or opportunity cost) observed by the farmers would not be linked to the true quality of the output provided. If prices are not determinant for the willingness of extension educators

to provide risk management educational training, other factors determine the willingness to supply such training. For example, universities supporting the extension educators provide human capital as outputs, using research and other information as inputs into the production process. It is possible that an extension educator's success may be attached to the number of farmers enrolled in each of his/her training courses offered, and an economic compensation is assumed to follow those who are more successful in the production of human capital.

Our model of extension educators' supply of risk management educational training follows the model of higher education developed by Rothschild and White (1995). We assume that each extension educator has available to it a number of educational training sessions in risk management involving multiple inputs and multiple outputs. The production function that represents these training sessions is:

$$Y^t = G^t(F_1^t, \ldots\ldots, F_N^t; H_1^t, \ldots\ldots, H_N^t), \quad t = 1, \ldots\ldots, T \tag{1}$$

Where Y^t is the amount of risk management educational training courses provided by extension educator t, F^t_N is the number of farmers of type n attending risk management educational training by extension educator t, and H^t_N is the amount of human capital of type n produced by extension educator t. The G^t function is assumed to be concave so that second order conditions are satisfied.

From equation (1) the sign of the following partial derivatives is assumed:

$$\frac{\partial G^t}{\partial H_N^t} \geq 0 \quad and \quad \frac{\partial G^t}{\partial F_N^t} < 0 \tag{2}$$

The positive sign on the partial derivative with respect to H^t_N is assumed since human capital is an output. The negative sign on the partial derivative with respect to F^t_N is assumed since farmers attending risk management educational training are an input, though we expect that extension educators would normally operate in the region in which the marginal value of additional risk management training decreases as more farmers participate.

Assume that there is Q_n number of farmers attending risk management training courses. A feasible allocation of farmers to courses available must satisfy:

$$\sum_{t=1}^{T} F_n^t = Q_n, \quad n = 1,\ldots\ldots\ldots, N \tag{3}$$

The social allocation problem is:

$$maximize \quad \sum_{t=1}^{T} \sum_{n=1}^{N} H_n^t - \sum_{t=1}^{T} Y^t \tag{4}$$

Subject to (1), (3), and:

$$Y^t \geq 0, \quad H_n^t \geq 0, \quad and\ F_n^t \geq 0 \tag{5}$$

The first order conditions are:

$$\frac{\partial G^t}{\partial H_N^t} = 1 \quad and \tag{6}$$

$$-\frac{\partial G^t}{\partial F_N^t} = \lambda_n \tag{7}$$

Where λ_n is the Lagrangean multiplier.

These conditions can be interpreted as follows. Equation (6) states that each extension educator's production of human capital should be extended to the point at which its

marginal cost is equal to unity. In other words, the marginal cost of producing an additional unit of human capital should equal its marginal product. Equation (7) states that the optimal allocation of farmers to training courses must be such that the marginal rate of substitution of a farmer of type n with respect to the general pool of farmers is the same for all the extension educators.

Given this model, the extension educators' production of human capital H^*, measured as the supply of risk management training courses offered per year, is conditioned on the parameters of the decisions problem. These parameters can be described as the extension educators' own special attributes (A), extension educators' education and previous training activities (E), extension educators' value of agricultural production under their responsibility (V), and extension educators' risk management knowledge and risk perceptions (R). The extension educators' supply of risk management training courses can be shown as a function of the following inputs so that:

$$H_i^*(A, E, V, R) \tag{8}$$

Thus, under these assumptions, we expect the supply of risk management courses to be a function of the extension educators' attributes, education, experience, value of agricultural production in the location they serve, and risk perceptions. We empirically investigate the extension educators' supply of risk management training courses to farmers below.

Econometric Procedure

An analysis of risk management training courses supply need to acknowledge that in some situations the risk management educational output of some extension educators has been zero for a given year, thus raising the issue of selectivity or censored samples.

A standard approach to deal with censoring is the use of Tobit models (Tobin). An econometric model is based on equation (7). It consists of a univariate Tobit model of extension educators' risk management training courses supply, which is fitted to the whole sample.

The basic Tobit model (Tobin) is usually given in terms of an index function (Greene) by:

$$\begin{aligned} &Y_i^* = \beta' X_i + \varepsilon_i, \\ &Y_i = 0 \quad if \;\; Y_i^* \le 0, \\ &Y_i = Y_i^* \;\; if \quad Y_i^* > 0 \end{aligned} \tag{9}$$

It can be shown that for an observation randomly drawn from the population,

$$E[Y_i \mid X_i] = \Phi\left(\frac{\beta' X_i}{\sigma}\right)\left(\beta' X_i + \sigma\lambda_i\right), \quad where \quad \lambda_i = \frac{\phi\left(\beta' X_i / \sigma\right)}{\Phi\left(\beta' X_i / \sigma\right)} \tag{10}$$

Therefore, the marginal effects are:

$$\frac{\partial E[Y_i \mid X_i]}{\partial X_i} = \beta\Phi\left(\frac{\beta' X_i}{\sigma}\right) \tag{11}$$

The parameters of this model can be estimated with maximum likelihood techniques.

Data

Table 1 provides a description of the variables involved in this study, and Table 2 provides summary statistics on the dependent and independent variables. The empirical model related the total number of risk management education training programs to observable extension educators' characteristics, such as attributes, education and previous training activities, value of agricultural production at risk, risk management knowledge, and risk perceptions. The dependent variable is the number of risk management education training programs held in the last three years by extension educators. Fifty-two percent of

the extension educators indicated that they held at least one risk management education training program in the last three years. Those who supplied risk management training to farmers averaged 2.6 programs. The high percentage of those providing no risk management training indicates that the choice of an econometric model that takes into consideration censoring in the dependent variables is appropriate.

The remaining variables in Table 1 are independent explanatory variables included in the analysis. The first five variables (percent agriculture, experience, Texas, Indiana, and Mississippi) are measures of the extension educators' own special attributes (A) in equation (8). Percent agriculture indicates the extension educators' percent of time devoted to agricultural responsibilities. It is expected that time allocated to agricultural responsibilities and the supply of risk management training will be positively correlated. On average, extension educators in this sample allocated 73.5 percent of their time to agricultural responsibilities

Experience indicates the extension educators' years of experience. It is expected that more experienced extension educators will supply more risk management training courses to farmers. On average, extension educators in this sample had 16 years of experience.

The next three variables (Texas, Indiana, and Mississippi) are regional dummy variables. It is expected that, due to the differing crop and livestock agricultural production activities across states, extension educators would tend to supply different amounts of risk management training to farmers. On average, 46.2 percent of the extension educators in this sample work in Texas followed by 19.2 percent who work in Indiana, and 18.2 percent who work in Mississippi.

The next two variables (crops and livestock) are measures of the extension educators' value of agricultural production under their responsibility (V) in equation (8). Crops measure the dollar value of all crops in the extension educators' county or area. It is expected that there will be a positive correlation between crop values and additional risk management training provided by extension educators to farmers in their counties or area. On average, the value of all crops under the extension educators' responsibility was $28,568,801.10 for this sample.

Livestock measures the dollar value of all livestock in the extension educators' county or area. Again, it is expected that there will be a positive correlation between livestock values and additional risk management training provided by extension educators to farmers in their counties or area. On average, the value of all livestock under the extension educators' responsibility was $35,843,365.90 for this sample.

The next three variables (previous training, advanced education, and agricultural economics degree) are measures of the extension educators' education and previous training activities (E) in equation (8). Previous training measures whether the extension educators have attended any educational program on risk management during the past three years. It is expected that there will be a positive relationship between extension educators' additional training in risk management and their own supply of risk management training to farmers. On average, 70.9 percent of the extension educators in this sample attended any educational program on risk management during the past three years.

Advanced education measures whether the extension educators have a Master or PhD degree. It is expected that there will be a positive relationship between extension

educators' advanced education and their own supply of risk management training to farmers. On average, 85.4 percent of the extension educators in this sample had a Master or PhD degree.

Agricultural economics degree measures whether the extension educators have a degree in agricultural economics. It is expected that there will be a positive relationship between extension educators' holders of an agricultural economics degree and their own supply of risk management training to farmers. On average, 15.2 percent of the extension educators in this sample had an agricultural economics degree.

The last three variables (risk management knowledge, perceived farmers' risk management knowledge, and abnormal returns) are measures of the extension educators' risk management knowledge and risk perceptions (R) in equation (8). Risk management knowledge is measured as a five-point Likert variable ranging from 1 (low knowledge) to 5 (very knowledgeable). It is expected that extension educators' increased risk management knowledge will be positively correlated with additional supply of risk management training education to farmers. On average, extension educators in this sample indicated having a slightly more than average knowledge of risk management techniques (2.62 out of 5 on the Likert scale).

Perceived farmers' risk management knowledge is measured as a five-point Likert variable ranging from 1 (low knowledge) to 5 (very knowledgeable). It is expected that extension educators who perceive farmers as being knowledgeable on risk management techniques will be less willing to supply additional risk management training education. On average, extension educators in this sample perceived farmers as having slightly more

than an average knowledge of risk management techniques (2.67 out of 5 on the Likert scale).

Abnormal returns measure the extension educators' belief that forward contracts and futures/options strategies will result in higher prices for the farmers rather than selling in the cash market. It is expected that extension educators who perceive that farmers have the possibility of generating abnormal returns through marketing strategies will be more willing to supply additional risk management training education. On average, 68.2 percent of the extension educators in this sample believe that farmers can capture abnormal returns from the market.

Results

The model results reported in table 3 indicate that several of the explanatory variables are highly significant in explaining the extension educators' supply of risk management training education to farmers. Percent agriculture is positively correlated with extension educators' supply of risk management training education. The coefficient implies that a 10 percent increase in extension educators' time devoted to agricultural responsibilities increases the supply of risk management training education by 2.2 percent.

Contrary to expectations, experience is negatively correlated with extension educators' supply of risk management training education. The coefficient implies that an additional year of extension educators' experience implies a reduction in the supply of risk management training education of 2.7 percent.

Extension educators working in Mississippi tend to supply less risk management training courses to farmers. The coefficient implies that, on average, extension educators

working in Mississippi reduce their supply of risk management training education by 2.6 courses per year.

The dollar amount of the value of all crops in the extension educator's county/area is positively correlated with extension educators' supply of risk management training education. Schroeder et al. observed that crop producers use more risk management techniques than other commodity producers. Therefore, it is expected to observe an increased supply by extension educators based on more risk management training education demanded by crop producers The coefficient implies that an additional million-dollar increase in crop value increases the supply of risk management training education by 2.4 percent.

The dollar amount of the value of all livestock in the extension educator's county/area is negatively correlated with extension educators' supply of risk management training education. Schroeder et al. observed that livestock producers tend to use less risk management techniques that crop producers. Therefore, it could be argued that this result implies a supply adjustment by extension educators based on less risk management training education demanded by livestock producers. The coefficient implies that an additional million-dollar increase in livestock value decreases the supply of risk management training education by 1.1 percent.

Extension educators' previous training is positively correlated with increased supply of risk management training courses to farmers. The coefficient implies that, on average, extension educators who received previous training in risk management increase their supply of risk management training education by 4.2 courses per year.

Extension educators' advanced education is positively correlated with increased supply of risk management training courses to farmers. The coefficient implies that, on average, extension educators who hold Master or PhD degrees increase their supply of risk management training education by 1.7 courses per year. Interestingly, whether the extension educators hold a degree in agricultural economics was not significantly correlated with the supply of risk management training courses to farmers.

The coefficient that measures extension educators' knowledge in risk management techniques is positively correlated with increased supply of risk management training courses to farmers. The coefficient implies that, on average, extension educators who consider themselves highly knowledgeable of risk management techniques increase their supply of risk management training education by 4.6 percent.

According to expectations, the coefficient that measures extension educators' perceived farmers' risk management knowledge is negatively correlated with the supply of risk management training courses to farmers. The coefficient implies that, on average, extension educators who consider farmers to be highly knowledgeable of risk management techniques decrease their supply of risk management training education by 4.8 percent.

The coefficient that measures extension educators' perception that farmers can obtain abnormal returns using forward and futures market strategies is positively correlated with increased supply of risk management training courses to farmers. This result is similar to what Anderson and Brorsen found with respect to extension economists market timing strategies. The coefficient implies that, on average, extension educators who believe farmers can capture abnormal returns using marketing strategies

rather than selling in the cash market increase their supply of risk management training education by 1.2 courses per year.

Conclusion

This paper examined the determinants of the supply of risk management training education by extension educators. This paper contributes to the body of literature directed at understanding the supply of risk management training, with the addition that focuses on the extension educators' characteristics, which is an area that has not received a substantial amount of attention from researchers.

According to expectations, extension educators' percent of time devoted to agricultural responsibilities was a significant factor in explaining an increased supply of risk management training education. On the other hand, increased experience reduces the likelihood of the extension educators' supply of risk management training education to farmers. It could be argued that extension educators who are more in contact with their clientele and devote more time to understand and solve their clientele problems would be more motivated to organize additional training courses based on the observed demand for those. On the other hand, more seasoned, experienced extension educators are more likely to move to administrative positions thus decoupling themselves from the farmers needs in terms of additional training. Parcell points out that this decoupling of the extension educator from his role in social capital transfer is one of the main factors affecting the future of extension in the U.S. Another feasible interpretation of these results would imply that, being risk management a relatively complex topic, older extension educators would have less motivation to spend additional time and effort

learning about it, and therefore their risk management training supply is reduced accordingly.

The supply of risk management training courses in Mississippi is significantly smaller than in other states in our study. Mississippi extension educators are a group of highly educated individuals from various backgrounds in the agricultural sciences and many years of field experience. Nevertheless, they consider themselves deficient in terms of preparation in several areas of agricultural risk management. There are several implications derived from this finding. First, the university system must take a more active role in providing extension educators with the training they need in order to increase the number of meetings held in risk management per year. Since extension educators and producers consider themselves as not being well prepared in the different risk management techniques available, there is an opportunity for the university system to fill the void. Second, since both the extension educators and the producers identify risk management experts as their preferred source of risk management education, it is expected that risk management experts currently working in the university system need to become more active collaborating with their respective extension branch developing the required risk management training.

According to expectations, there was a positive correlation between crop values and additional risk management training provided by extension educators to farmers in their counties or area. It is expected that in regions were commodity crops are dominant, the farmers' demand for training in forward contracting, futures and options contracts, financial risk management, and crop insurance would be significant. On the other hand, it is not surprising that livestock producers demand less risk management training since the

risk management options for livestock producers are more reduced than those available for crop producers. Schroeder et al. reached a similar conclusion on their survey of Cattle Profit participants. It was found that cattle producers used less futures contracts than crop producers. Therefore, the reduced supply of risk management training education is consistent with extension educators' adjustments to an observed demand of training by farmers.

Extension educators' previous training and advanced education is positively correlated with increased supply of risk management training courses to farmers. This result provides evidence of the importance of the link between the extension service and the universities. If extension educators receive better training in risk management techniques by university researchers, they will be able to better serve their clientele by passing down this knowledge. Interesting to note that the fact to possess an advanced degree, not necessarily in agricultural economics or other social science, increases the extension educators' willingness to supply additional risk management training education. It appears that increasing the extension educators' human capital is a promising way to reach an increase in the supply of risk management training education to farmers.

Extension educators' knowledge in risk management techniques is positively correlated with increased supply of risk management training courses to farmers. Again, this result points out at the importance of the universities in which training play a key role providing extension educators the tools they need to train farmers in risk management. This result proves the usefulness of risk management training received by extension educators at the university setting.

It is not surprising that extension educators who perceive farmers as being highly knowledgeable in risk management techniques will decrease their supply of risk management training education accordingly. As Ilvento and Hanson pointed out, due to the scarcity of resources available and tight extension budgets, it is expected that extension educators would reduce supply of risk management training education for farmers they consider knowledgeable already and concentrate in farmers and regions where deficiencies in training still exist.

Another interesting result involves the positive correlation between the extension educators' perception that farmers can obtain abnormal returns using forward and futures market strategies and their increased supply of risk management training courses to farmers. This opens a series of questions related to the objective of risk management training education. Are the extension educators' perceptions consistent with the farmers' own perceptions of the market? If that is the case, then the training supplied is consistent with the demand for this type of risk management knowledge. On the other hand, as Schroeder et al. pointed out, the efficient market hypothesis that implies that market price reflects all relevant information leaving little or no room for abnormal returns. In that case, are extension educators' perceptions consistent with the best interest of their clientele? In that case, it could be argued that extension educators are failing to provide adequate and effective risk management by letting their overconfidence as market forecasters decide the path of their risk management training.

This research provides evidence of some important issues related to the extension educators' supply of risk management training education to farmers by quantifying some well-known effects. Other interesting findings include the lack of significance of

extension educators having an agricultural economics degree supplying additional risk management training education to farmers.

It is expected that this paper may increase the information available on extension educators. Furthermore, this research provides additional information on extension educators' perceptions on risk management information, preferred risk management tools and learning methods. Ultimately, the optimal supply of risk management training should receive the input of the extension educator, the university researcher, and the farmer. More information is needed on how these three players interact.

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Table 1. Extension educators' supply of risk management educational training programs. Description of variables.

Variables	Description
Dependent Variables	
Risk management programs held	Number of risk management education training programs held in the past 3 years.
Independent Variables	
Percent agriculture	Extension educator's percent of time devoted to agricultural responsibilities.
Experience	Extension educator's years of experience.
Texas	Dummy variable = 1 if the extension educator works in Texas.
Indiana	Dummy variable = 1 if the extension educator works in Indiana.
Mississippi	Dummy variable = 1 if the extension educator works in Mississippi.
Crops	Dollar amount of the value of all crops in the extension educator's county/area.
Livestock	Dollar amount of the value of all livestock in the extension educator's county/area.
Previous training	Dummy variable = 1 if the extension educator has attended any educational program on risk management during the past 3 years.
Advanced education	Dummy variable = 1 if the extension educator has a Master or PhD degree.
Agricultural Economics degree	Dummy variable = 1 if the extension educator has a degree in Agricultural Economics.
Risk management knowledge	Five-point Likert variable ranging from 1 (low knowledge) to 5 (very knowledgeable).
Perceived farmer's risk management knowledge	Five-point Likert variable ranging from 1 (low knowledge) to 5 (very knowledgeable).
Abnormal returns	Dummy variable = 1 if the extension educator believes that forward contracts and futures/options strategies will result in higher prices for the farmer than selling in the cash market.

Table 2. Extension educators' supply of risk management educational training programs. Summary statistics of variables.

Variable	N	Mean	Minimum	Maximum
Risk management programs held [a]	296	2.60	0	96
Percent agriculture	296	73.50	5	100
Experience	296	16.00	0	35
Texas	296	0.462	0	1
Indiana	296	0.192	0	1
Mississippi	296	0.182	0	1
Crops	296	28,568,801.10	0	221,000,000
Livestock	296	35,843,365.90	0	410,000,000
Previous training	296	0.709	0	1
Advanced education [bcd]	296	0.854	0	1
Agricultural Economics degree	296	0.152	0	1
Risk management knowledge	296	2.62	1	4.8
Perceived farmer's risk management knowledge	296	2.67	1	4.2
Abnormal returns	296	0.682	0	1

[a] Fifty-two percent of the extension educators in the sample indicated that they had held at least one risk management training course during the last three years.

[b] Ninety-one percent of the extension educators in the sample indicated that they had a Bachelor of Science degree.

[c] Eighty-one percent of the extension educators in the sample indicated that they had a Master degree.

[d] Four percent of the extension educators in the sample indicated that they had a PhD degree.

Table 3. Extension educators' supply of risk management educational training programs. Univariate Tobit model results.

Variable	Maximum Likelihood Coefficient	Marginal Effects
Intercept	-19.380 (3.923)	
Percent agriculture	0.059 (0.033)	0.022**
Experience	-0.0073 (0.036)	-0.0027**
Texas	-0.554 (2.158)	-0.207
Indiana	-2.046 (2.526)	-0.764
Mississippi	-7.195 (2.843)	-2.688***
Crops	0.0000066 (0.0000024)	0.0000024***
Livestock	-0.0000031 (0.0000016)	-0.0000011***
Previous training	11.389 (2.028)	4.255 ***
Advanced education	4.595 (2.205)	1.717***
Agricultural Economics degree	-0.860 (2.026)	-0.321
Risk management knowledge	0.012 (0.75E-02)	0.0046*
Perceived farmer's risk management knowledge	-0.013 (0.0066)	-0.0048**
Abnormal returns	3.307 (1.684)	1.235**
σ = 10.7067*** (0.6478)		

Numbers in parentheses are standard errors. Single, double, and triple asterisks indicate statistical significance at the α = 0.1, 0.05, and 0.01 levels, respectively.