

# Attitudes Toward Risk in a Changing Agricultural Marketing Environment

Mark Welch and David Lamie

*JEL Classifications: Q10, Q13, Q19*

*Keywords: Agricultural E-Commerce, Food Product Liability, Futures Markets, Risk Preference*

This issue of Choices continues the discussion of risk management with a focus on decision making in risky environments. If risk can be defined as exposure to uncertain consequences, particularly unfavorable consequences (Hardaker et al., 2004), then risk management implies that decision-makers have some degree of choice or action by which they can influence the outcome of risky endeavors or mitigate the impact of the unfavorable outcomes.

We begin with a discussion of the risk preference characteristics of those involved in production agriculture. We then turn to efforts and tools these producers use to manage risk, beginning with commodity risk management through futures and options. Direct marketing alternatives via agricultural e-commerce are discussed. Finally, food safety liability among specialty crop producers is examined.

The first article, “How Well Do Farmers Tolerate Risk,” by Brian Roe, examines whether the risk environment of farming has shaped who has entered and stayed in farming. He goes on to evaluate the degree of risk tolerance of farmers in comparison to both the general population and nonfarm business owners.

Futures and options markets are means by which commodity producers and users can reduce price risk through hedging. But the changing environment of futures markets—volatility, convergence issues, misappropriation of margin accounts—has raised the question of whether farmers and ranchers still perceive futures markets as viable marketing tools. Mark Welch et al. examine this issue in the second article, “Have Concerns over Futures Market Integrity Impacted Producer Price Risk Management Practices?”

## Articles in this Theme:

**How Well Do Farmers Tolerate Risk? Comparisons with Nonfarm Business Owners and the General Population**

**Have Concerns over Futures Market Integrity Impacted Producer Price Risk Management Practices?**

**Does E-Commerce Help Agricultural Markets? The Case of MarketMaker**

**Food Product Liability Insurance: Implications for the Marketing of Specialty Crops**

In “Does E-Commerce Help Agricultural Markets? The Case of MarketMaker,” Carlos Carpio, Dave Lamie, Olga Isengildina-Massa, and Samuel Zapata look at the development of agricultural e-commerce platforms like MarketMaker. MarketMaker, created in 2000 by a team of University of Illinois Extension personnel, is an interactive e-commerce platform that provides food marketing information to food entrepreneurs and their customers. Electronic markets in general are expected to be more transparent and competitive than physical markets. However, given the relatively new state of e-commerce in agriculture, its impact has not been widely measured and documented.

In the last article by Kathryn A Boys, the impact of food product liability insurance requirements on specialty crop farmers is examined. Boys finds in her article “Food Product Liability Insurance: Implications for the Marketing of Specialty Crops” that inefficiencies associated with

food product liability insurance could effectively increase the cost of specialty crop production, while limiting the ability of producers to sell products even through direct marketing channels. As a result, revenues and profitability could decline and, in some cases, viability of some producers could be affected.

### **For More Information**

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*Mark Welch (jmwelch@tamu.edu) is Assistant Professor and Extension Economist in the Department of Agricultural Economics at Texas A&M University and David Lamie (dlamie@clemson.edu) is Associate Professor and Extension Specialist, Agribusiness Program, School of Agricultural, Forest, and Environmental Sciences, Clemson University*

## How Well Do Farmers Tolerate Risk? Comparisons with Nonfarm Business Owners and the General Population

Brian E. Roe

*JEL Classifications: D81, Q12*

*Keywords: Risk Management in Agriculture, Risk Tolerance, Farm Policy*

Few would disagree that farmers face substantial risks from Mother Nature and markets alike, and that farmers must make crucial decisions balancing risk and reward on a regular basis. However, little consideration has been given to how the risk endemic to farming has shaped who has entered and stayed in farming and the risk tolerance of the farmers that remain. For example, has the constant exposure to and experience with risk made U.S. farmers better able to tolerate risk than the general population? Have government programs designed to help manage and mitigate farm risk allowed farmers with less tolerance for risk to survive where those with similar risk tolerance in nonfarm businesses may have exited? Are there other distinct features of the farming sector, such as specialized assets, inheritance, or land wealth, that interact with occupational sorting to affect the distribution of risk tolerance among farmers?

### Risk Attitudes, Self-Employment, and Farming

One view of the role that risk attitudes play within the economy is that individual risk attitudes influence the genesis of firms and, hence, industrial organization (Knight, 1921). Specifically, risk-tolerant individuals seek entrepreneurial activities such as owning a small business or becoming otherwise self-employed, while the risk intolerant gravitate toward employee status. Several studies have validated this logic using a variety of different data sets and indicators for risk tolerance (Cramer et al., 2002; van Praag and Cramer, 2001; Xiao et al., 2001; and Hvide and Panos, 2013), though none have explored differences between farming and other occupations. This is critical because farming differs from other forms of small business ownership and self-employment on several fronts.

Sometimes entering farming is more the outcome of intergenerational inertia than of a free, unfettered choice among all feasible professions (Laband and Lentz, 1983). Some would argue that, more than other forms of small business, family ties are crucial to farming entry decisions because such ties often provide the key knowledge, experience, and skills necessary to become a successful farmer. And that's not to mention the fact that family ties often provide the access to land and other crucial assets. So, while the nonfarm child who loves risk may choose to run a small business rather than take a salaried job, the child of a farmer who, deep down, doesn't really like to take risks, may end up running the family farm even if that salaried job was available. Furthermore, such decisions may have intergenerational implications as mounting evidence suggests that risk attitudes are passed from generation to generation (Dohmen et al., 2012; and Zhong et al., 2009). Farming is also different in that federal and state programs provide assistance to farmers in managing downside risk in the forms of subsidized insurance products and income support through various program payments, though the availability and scope of programs has differed by agricultural product (e.g., row crops versus horticultural products) and by year due to differences across farm bills.

### Surveying Farmers, Business Owners, and the General Population

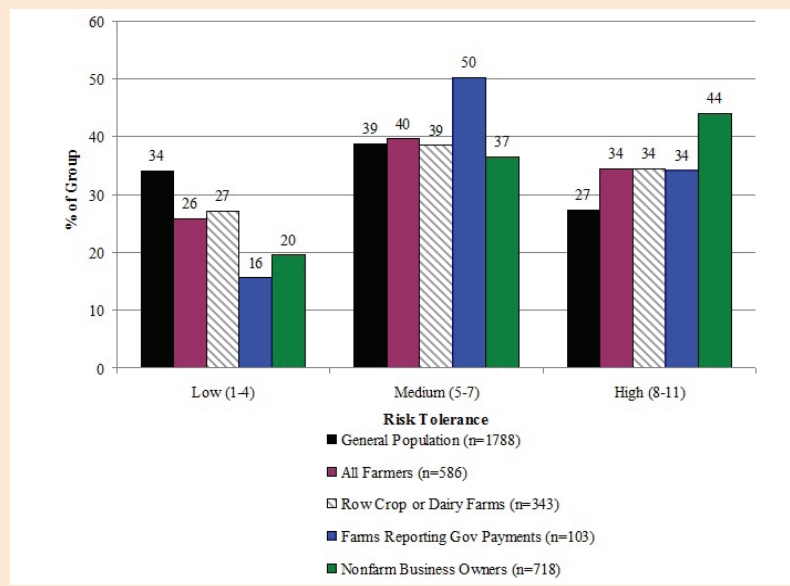
The fundamental objective of this article is to provide a description of the risk tolerance of farmers relative to the general population and relative to nonfarm businesses. To assess the relative risk tolerance of U.S. farmers, I worked

with a commercial polling firm to conduct several national phone surveys. In some surveys, farm and non-farm business owners were oversampled to ensure a sample large enough to provide sufficient statistical power. Weights were applied to both farm and business owner samples so that they would be nationally representative of farm and business owner age, race, and gender. To assess risk tolerance, the following question was asked: “How do you see yourself? Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?” Respondents were told to rate themselves on an eleven point scale where the lowest value corresponded to the statement “Don’t like to take risk” and the largest value corresponded to the statement “Fully prepared to take risks.”

The answer to this question proved effective in predicting a broad range of observed behaviors when used by other researchers. For example, this question was asked of tens of thousands of Germans as part of a large, ongoing study of the German population. Researchers found that it predicted behavior such as smoking, traffic offenses, investment behavior, willingness to migrate, and likelihood of self-employment (Jaeger et al., 2010; and Dohmen et al., 2011). It also predicted behavior in subsequent lab experiments where respondents bet real money on uncertain outcomes. Perhaps most importantly, it has been shown to predict U.S. farmers’ past and intended use of the Internet to buy and sell used farm equipment even after controlling for other confounding factors such as age, gender, income, farm size, and trust attitudes (Roe, Batte, and Diekmann 2013).

The core results of risk tolerance from the sample are displayed in Figure 1. The black bars furthest left in each cluster are the general population results while the green bars furthest right are nonfarm business

**Figure 1: Risk Tolerance by Professional Group**



owners. The bars in the middle are various farm samples including all farmers (purple), farmers reporting growing row crops, field crops, hay, grass or dairy animals (cross-hatched gray) and farmers reporting the receipt of income from the Federal government for participation in commodity, conservation or disaster aid programs.

The pattern among the bars in Figure 1 is quite clear: risk tolerance differs across the three population segments. For example, the first cluster of bars on the left displays the percent of each professional group that rates themselves as being intolerant of risk (i.e., a rating of four or less). About one-third of the general population is in this least-risk-tolerant group while only 20% of nonfarm business owners are in this group. Farmers fall in between, with about one in four describing themselves with a rating of four or less.

In the far right cluster of bars, the stair-step pattern is reversed, with 27% of the general population rating itself in the highly risk tolerant group (a rating of eight or above) and 44% of nonfarm business owners rating

themselves similarly. Once again, farmers are in between the general population and the nonfarm business population, with 34% of farmers falling in this most-risk-tolerant group. Nearly all population segments have about 40% of people identifying themselves in the middle risk tolerance group. Further analysis confirms that farmers are indeed less risk tolerant than nonfarm business owners. However, farmers are more risk tolerant than the general population sampled.

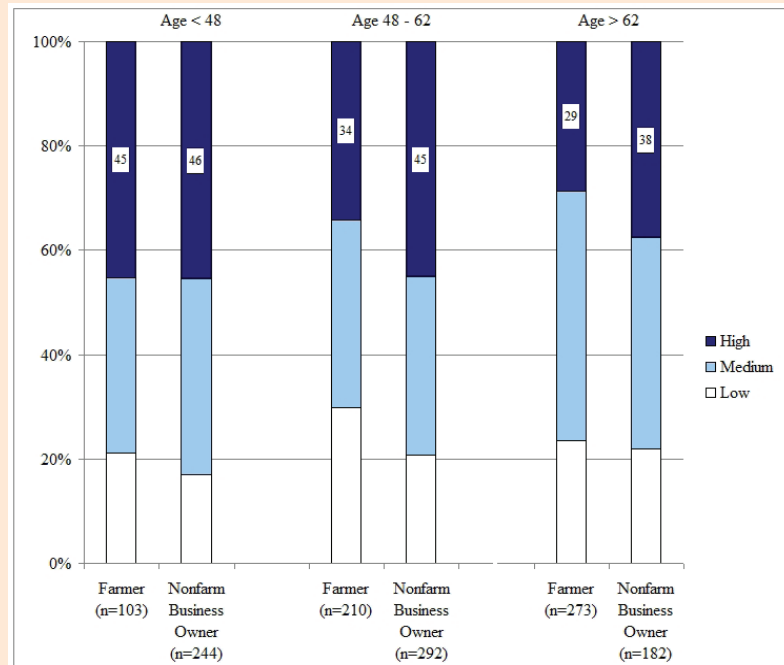
Why do farmers—who surely face more risk than the general population and perhaps similar risk to their nonfarm business counterparts—turn up as the middle group? To understand, consider a key difference between these three groups: age (Table 1). Farmers are much older than nonfarm business owners who themselves are older than the general population. This is important, given the focus on risk tolerance, because many researchers have documented a general decline in risk-taking behavior as people age (Dohmen et al., 2011; Barsky et al., 1996; and Mandal and Roe, In Print), suggesting one possible avenue

**Table 1**

Table 1			
Average Age by Population Segment			
	General Population	Farmers	Nonfarm Business Owners
Age	46.8	57.9	50.3

Source: Author calculations from survey data

**Figure 2: Farm and Nonfarm Business Owner Risk Tolerance by Age Group**



for the observed difference in risk tolerance between farmers and nonfarm business owners.

So, now the interesting question is: if we adjust for differences in age, what changes result? Figure 2 focuses on just farmers and nonfarm business owners and compares risk tolerance across those in similar age groups.

For those less than age 48, there is no difference in risk tolerance between farm and nonfarm business owner. In the middle group—those between 48 and 62 years of age—there is no longer a similar risk tolerance profile between farm and nonfarm business owners. For nonfarm business owners, about 45% are in the most highly risk-tolerant category. However, only

about one-third of farmers are in this highest risk tolerance category, while the number in the lowest risk tolerance category grows to 30%. For the older-than-65 group, some of the same differences observed in the middle group emerge, e.g., a higher percentage of the nonfarm group is in the highest risk tolerance category than is in the farm group. However, the membership in the low-risk-tolerant group is approximately equal.

**What about Farm Programs?**

This simple survey suggests that, as a population, farmers sit in the middle of risk tolerance between the more reticent risk attitudes of the general population and the more tolerant

viewpoint of nonfarm business owners. However, this coincides with the fact that farmers are older than the general population. Indeed, among the youngest cohorts of farm and nonfarm business owners, risk attitudes are indistinguishable. It is only when comparing farm and nonfarm business owners who are in the middle age group or later, when the effects of aging may naturally erode human risk tolerance (Mandal and Roe, In Print) that we see nonfarm business owner risk tolerance surpass that of farmers.

Farm programs are also a distinct feature of the agricultural sector and remain a perennial topic of policy discussion regarding risk mitigation. From the 2007 Census of Agriculture, we know that 38% of U.S. farmers received some portion of the nearly \$8 billion in government farm payments, with an average payment exceeding \$9,500 per farm. Given recent political discussions of continued funding for farm payments, and the recent trend of directing policies toward insurance-based programs, the relative risk tolerance of farmers appears to be appropriate to the risk discussion.

To further explore how farm program availability may correlate with farmer risk tolerance, we can look at the farm subsamples in Figure 1. Most of the farmers surveyed were asked about the specific enterprises present on their farm and whether they had received income from Federal farm programs. The row and field crop sectors and the dairy sector have been the focus of numerous Federal government programs aimed at stabilizing farm incomes or helping manage farm risks over many decades. Hence, focusing on farmers in these sectors may be instructive to thinking about the risk tolerance composition of sectors with a history of Federal support. The subsample of farmers from sectors with a history of farm program payments tracks closely with



the overall sample of farmers in terms of risk tolerance categories (Figure 1, cross-hatched gray bars versus solid gray bars). Statistical tests reject any significant differences between farmers in these sectors and the farmers not involved in these sectors.

Another way to parse the data is to compare those who report actually receiving Federal farm program monies (checkered gray bars) to farmers who do not report receiving such compensation. This group appears distinct from the overall farm sample as fewer program income recipients appear in the lowest risk category and more appear in the middle risk tolerance category. Formal tests verify the statistical significance of this difference between the two groups of farmers and between farmers reporting government payments and non-farm business owners. However, the percent of farm payment recipients in the highest risk tolerance category is nearly identical to the overall farm population. It must be noted that only 19.3% of the weighted farm sample from the survey data reports receiving farm payment benefits, which is significantly less than 38% of farmers receiving Federal farm program payments in the 2007 Census of Agriculture.

Does the difference in risk tolerance between farmers and nonfarm business owners or between farmers and the general population or between farm program payment recipients and non-recipients in this sample have implications for production agriculture in the United States? Some studies suggest that lower risk tolerance within a sector can lead to lower sectoral wages and returns (Kihlstrom and Laffont, 1979; and Friedman, 1953), but little empirical work exists testing such conjectures. One might imagine that those who are more risk tolerant may make more reckless decisions, but they may also make more bold and innovative decisions.

The finding that farmers have greater risk tolerance than the general population also leads to some interesting questions. For example, should federal policy focus on subsidizing risk management programs for a population like farmers that is more tolerant of risk than the general population? Or do risk management programs benefit both farmers and the general population by stabilizing farm sector production and food prices?

Farming risk will not dissipate. Therefore, understanding the ability of farmers to tolerate risk is an important endeavor. Furthermore, understanding how the pressures of farming, and how the peculiarities of the farm sector—including inheritance, farm programs, and sector-specific human and physical capital—may sort people with different risk tolerance in and out of farming remains a relevant area for future study.

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*Brian E. Roe (roe.30@osu.edu) is a Professor, Department of Agricultural, Environmental and Development Economics, The Ohio State University, Columbus.*

## Have Concerns over Futures Market Integrity Impacted Producer Price Risk Management Practices?

Mark Welch, David Anderson, John Robinson, Mark Waller, Stan Bevers, Rob Hogan, Steve Amosson, Dean McCorkle, Jackie Smith, and Emmy Williams

JEL Classifications: Q11, Q13

Keywords: Hedging, Marketing, Risk Management Education

Futures markets offer a means by which commodity producers and users can reduce price risk through hedging. Forward pricing using futures contracts is based on the premise that, over time, the local cash price and futures prices move together. Therefore, adjusting for local conditions, pricing in the futures market is a close approximation to pricing in the cash market. Futures markets then determine the value of many agricultural commodity spot markets and forward contracts. Hedgers are required to make margin deposits with their brokers to insure they can meet their financial obligations. Funds held in margin accounts as a performance bond are assumed to be secure, safely held in segregated accounts at the brokerage firm.

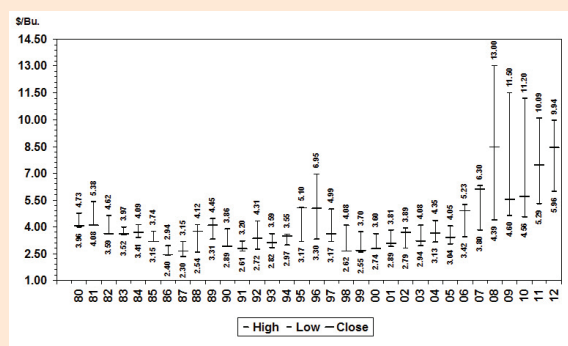
Since 2007, the environment for trading futures and options has changed: prices have become more volatile, futures and cash prices have not converged at historically normal levels, and margin account funds have been misappropriated. This article reports on an analysis used to determine if farmers' attitudes and behaviors have changed in regards to futures markets given these developments. Participants in Master Marketer, a 64-hour risk management educational program sponsored by Texas A&M AgriLife Extension Service, were surveyed to see if futures and options are still perceived as viable tools of price risk management in today's turbulent economic environment.

### Increased Price Volatility

A major feature of the boom in commodity prices since the mid-2000s is the dramatic increase in price volatility (Baffes and Haniotis, 2010; Carter, Rausser, and Smith, 2011; and Karali, and Power, 2013). For example, the

average difference between the contract high and the contract low for the July Kansas City Board of Trade (KCBT) wheat futures contract from 1980 to 2006 was \$1.17 per bushel (Figure 1). From 2007 to 2012, the average range increased to \$5.57 per bushel. During five of the years between 1980 and 2006, the high-low range in prices was less than the current daily trading limit of \$0.60 per bushel (1983, \$0.45; 1985, \$0.59; 1986, \$0.54; 1991, \$0.59; and 1994, \$0.58). Volatile markets increase hedging costs associated with financing margin calls. Maintaining a margin account during a major price move against the trader can exceed the credit limits of many hedgers. The price spike of 2008 caused unprecedented margin calls forcing several large cotton merchant firms and some small- to mid-sized grain elevators to exit the industry (Carter and Janzen, 2009; Hailu and Weersink, 2010).

**Figure 1: July KCBT Wheat Futures Prices, Contract High, Low, and Close, 1980 to 2012**



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## Cash/Futures Convergence Problems

Another feature of the commodity price boom is the lack of convergence—the futures price at expiration has more recently been beyond any historical norms of comparison to local cash markets (Irwin, Garcia, Good, and Kunda, 2008). Forward pricing using futures contracts is based on the premise that, over time, the local cash price and futures prices move together and that these prices will draw together when the futures contract expires or converge to a predictable level. Therefore, adjusting for local conditions, pricing in the futures market is a close approximation to pricing in the cash market. Cash and futures markets that fail to converge leave hedgers unprotected from price risk (Adjemian, Garcia, Irwin, and Smith, 2013).

Again using a wheat example, the region of Texas that accounts for the highest concentration of wheat production is identified in market reports as “Area North of the Canadian River” (USDA Market News, 2013). The Canadian River bisects the Texas Panhandle from west to east just north of Amarillo. The harvest basis in this region for the last 30 years has varied by roughly \$.40 per bushel, ranging

from \$.20 under to \$.60 under the July KC futures (Basis Project, 2013). This basis in 2010 plunged to \$1.25 under July KC futures (see Figure 2). With futures prices around \$4.85 at harvest, cash wheat prices in the Texas Panhandle fell to around \$3.60 per bushel. Some areas in central Texas reported basis levels in excess of \$2.00 under July futures—putting cash wheat prices below \$3.00 per bushel in the summer of 2010. This lack of convergence to a more average historic level left hedgers exposed to additional price risk.

## Security of Segregated Funds

Compounding the hedging expense and risk exposure associated with volatility and convergence, two futures commission merchants—MF Global and Peregrine Financial Group—about the same time were found to have misappropriated customer funds.

“While companies often make bad decisions and fail, no one expected the violation of one of the foundational principles of the futures markets: the protection of customer money. On Monday, October 31, at 2:30 in the morning, MF Global revealed that an estimated \$900 million in cus-

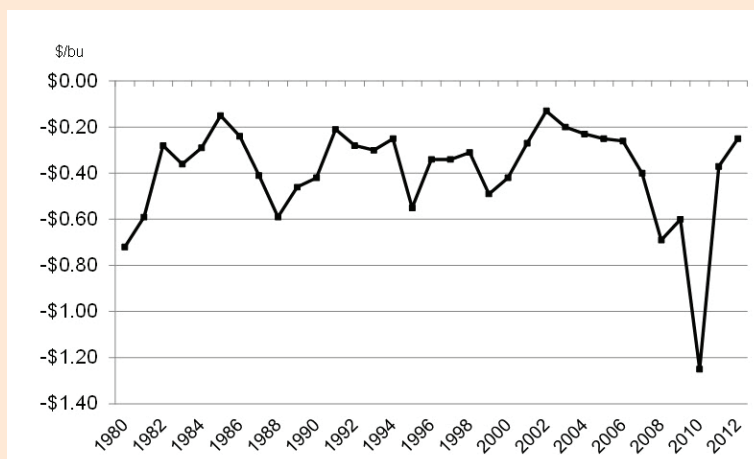
tomor money had gone missing—unaccounted for. MF Global filed for bankruptcy a few hours later.”

--Stabenow, 2011

Then in July 2012, the chief executive officer of Peregrine Financial Group was arrested for fraud in a 20-year scheme in which more than \$200 million in customer funds went missing. John Roe, co-founder of the Commodity Customer Coalition, in testimony before the U.S. Senate Agriculture Committee examining the futures markets in response to the failures of MF Global and Peregrine Financial Group, described the problem this way: “An industry which just a year ago prided itself that no customer had ever lost a penny as the result of a clearing member default now hopes customer losses due to broker insolvencies will be limited to hundreds of millions of dollars, instead of billions of dollars.” (2012) The Commissioner of the Commodity Futures Trading Commission, Jill Sommers, added, “...customers correctly understood the risks associated with trading futures and options, but never anticipated that their segregated accounts were at risk of suffering losses not associated with trading.” (2012)

These combined factors have created a climate in which confidence and trust in the use of futures contracts as an effective tool for price risk management may have been lost. Anecdotal evidence from some Texas producers reflected a possible change in their views of hedging due to these factors. In order to assess the degree to which these factors have impacted the risk management strategies of agricultural producers, this study surveys past participants in the Texas A&M AgriLife Extension Master Marketer program. While the group is not representative of all producers in Texas or the nation, it represents a sample of farmers and ranchers, merchandisers, and lenders with training and experience in the use of futures and options for hedging.

**Figure 2:** Wheat Basis, Texas-North of the Canadian River, Last Week of June Cash Price and July KCBT Futures



## The Master Marketer Program

In the 1990s, Texas A&M AgriLife Extension Service economists developed an in-depth risk management education program that became known as Master Marketer. The intensive, 64-hour risk management course focuses on marketing plan development and implementation; developing enterprise budgets and breakeven costs; and basic and advanced marketing tools including futures and options, basis, financial risks, fundamental and technical analysis, production risk alternatives (crop insurance, diversification, and integration), agricultural policy, international trade, value added processes, niche markets, and marketing clubs. As of 2013, 25 Master Marketer programs have been conducted in Texas with 1,051 graduates.

With an average age of 45, Master Marketers are younger than the average Texas farmer whose average age is 59 years (U.S. Department of Agriculture-National Agricultural Statistical Service (USDA NASS), 2009). Master Marketers manage an average of 2,422 crop acres, placing them in the 95<sup>th</sup> percentile of all farms in Texas. Master Marketers have a median gross income of \$437,500. According to USDA's 2007 Census of Agriculture, only 4.2% of farms in Texas reported gross incomes of \$250,000 or more. The tendency for Master Marketer graduates—producers who are younger, have larger operations, and have received marketing training—to use futures and options is consistent with other studies that found these characteristics to be important in the use of futures and options for price risk management (Musser, Patrick, and Eckman, 1996; Goodwin and Schroeder, 1994; Makus, Lin, and Krebill-Prather, 1990; Asplund, Forster, and Stout, 1989). A more detailed discussion of the characteristics of Master Marketer participants can be found in Qin et al. (2011)

A key component of the Master

Marketer program is a 2.5 year post-program survey of knowledge gains, practices implemented, and economic impact of participation in the program (Qin et al., 2011). Master Marketer graduates report a consistent increase in their understanding and willingness to use marketing concepts ranging from budget analysis and developing a marketing plan to general risk management, and crop and livestock marketing strategies including futures and options (McCorkle et al., 2009).

### Questions Asked

Some of the important questions addressed by the survey of Master Marketer graduates regarding the current risk environment of using futures and options for hedging included:

1. Have recent developments in the futures markets caused farmers and ranchers to stop using price risk management strategies based on futures markets?
2. Are farmers and ranchers increasing the use of other price risk management tools because of is-

sues raised in the futures markets?

3. What educational implications do these findings have for future price risk management educational programs?

Surveys were sent to 911 Master Marketer program graduates still involved with agriculture and for whom there was valid contact information. A total of 127 usable surveys were returned.

Demographic characteristics of survey respondents matched closely with the general profile of all Master Marketers in terms of age, farm size, farm revenue, and education. .

### Survey Results

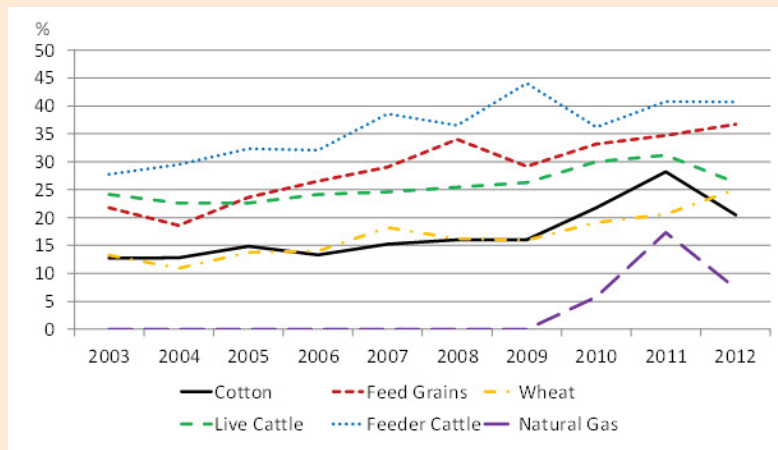
Findings show that, despite increased volatility, convergence issues, and margin fund security, Master Marketer graduates trained in the use of futures and options are, generally, hedging more rather than less. In reporting the percent of total production that was hedged with either futures or options, the average for all commodities from 2003 to 2007 was 18%; this increased to 25% for the 2008 to 2012 time frame. As might be expected the

Table 1:

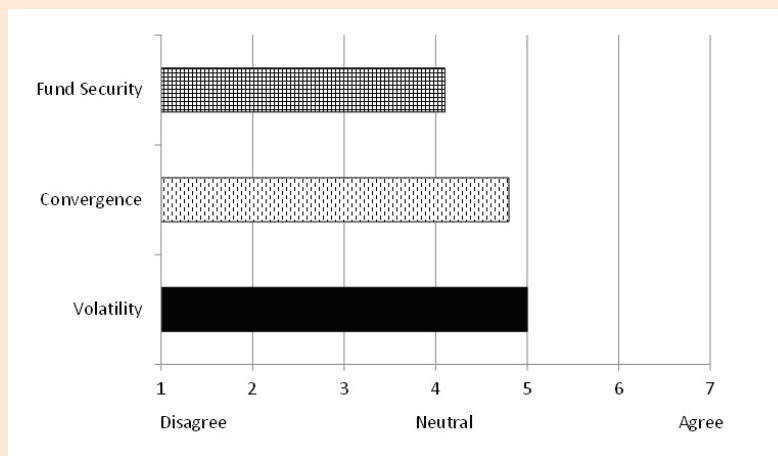
Table 1: Percent of Production/Utilization of Any of the Following Commodities that were Hedged during a Given Year using Futures and Options Contracts

Year	Cotton	Feed grains	Wheat	Live cattle	Feeder cattle	Natural gas
2003	13	22	13	24	28	0
2004	13	19	11	23	29	0
2005	15	24	14	23	32	0
2006	13	27	14	24	32	0
2007	15	29	18	25	39	0
2008	16	34	16	25	37	0
2009	16	29	16	26	44	0
2010	22	33	19	30	36	6
2011	28	35	21	31	41	17
2012	20	37	25	26	41	7
Average hedged 2003-2007: 18%						
Average hedged 2008-2012: 25%						

**Figure 3: Percent of Production/Utilization of Any of the Following Commodities that were Hedged during a Given Year using Futures and Options Contracts**



**Figure 4: Serious Impediments to the Use of Futures and Options, Average Scaled Survey Responses**



percent hedged varied by commodity (2003 compared to 2012): cotton from 14% to 21%, feed grains (corn and sorghum) from 22% to 36%, wheat from 11% to 25%, live cattle from 25% to 27%, and feeder cattle from 22% to 43% (Table 1 and Figure 3). A 20% increase was shown in the “other” category that represented primarily rice production.

Asked if they used other marketing tools for risk management in addition to or instead of futures and options, 67% reported that they did use other risk management practices. Responses included mostly cash

contracts, marketing pools, crop insurance, and grain storage. When asked if they used a marketing advisory service, 53% responded “yes.”

The most intriguing question of the survey, “Have you stopped or will you stop hedging altogether?” was answered “no” by 84% of the respondents. When asked if they had replaced or intended to replace futures/options hedging with some other risk management practices, the leading responses were to increase the use of cash contracting, pool marketing, and crop insurance.

Survey participants were asked to provide a scaled response to survey questions regarding disagreement or agreement (1 to 7, 1 = disagree, 7 = agree) with statements related to volatility, convergence and basis volatility, and margin fund security (Figure 4). When asked if increased futures price volatility and associated margins and options premiums are a serious impediment to the use of futures or options markets for risk management, the average of responses was 5.0 reflecting general agreement with that statement. Of the 122 who responded to that question, 63% responded with a scaled response of five or higher; 25% answered at level 7.

For the statement “More variable basis and less reliable convergence between futures prices and cash prices are a serious impediment to my use of futures and options markets for risk management,” the average response was 4.8, slightly lower than the level of agreement on the volatility statement but still may be seen as expressing general agreement. Of the 122 who responded to this statement, 57% rated their level of agreement 5 or higher, while 18% rated their level of agreement a seven.

Regarding fund security, for the statement “Margin account security with a brokerage house is a serious impediment to my use of futures and options markets for risk management,” the average level of agreement was 4.1, a more neutral response. Agreement was rated 5 or higher by 35% of 123 respondents; 11% agreed at level seven.

Results of this survey indicate that those who have received Master Marketer training are not likely to stop hedging with futures and options in spite of volatility, convergence issues, and fund security. Farmers trained in the use of futures and options continue to use them as viable tools to manage price risk.

Results also suggest that as farm income increases, a farmer is less

likely to have stopped using futures and options for hedging. Larger farms have the resources to fund margin accounts and pay higher option premiums relative to smaller farms. Increasingly larger farms may be more professional in their approach to risk management, utilizing a broader range of tools. While farms of all sizes need to manage price risk, large farms may be better able to absorb the risk inherent in the current commodity price environment.

As farmers age there is an indication of an increased likelihood of discontinuing the use of futures and options. Older farmers may view the benefits of risk management using futures and options outweighed by the risk inherent in their use, given either their degree of wealth or goals associated with their business (retirement security versus growth, for example). Older farmers may have a bias towards risk and prices set years ago by previous experience, in that option prices and margin requirements today are “just too high.” These findings are consistent with other studies that have found decreases in risk aversion as wealth increases and increases in risk aversion with advancing age (Martin and Eisenhauer, 2001; and Riley and Chow, 1992). Older farmers may be in a financial position that enables them to ‘self-insure’ against price risk.

### Concluding comments

Many stakeholders in the futures industry—producers, commercial interests, legislators, regulators, the exchanges themselves—have expressed concern that traditional hedgers will abandon the futures market due to the concerns analyzed in this research. While recent developments in the futures markets may have caused some farmers and ranchers to stop hedging with futures and options, the results of this analysis suggest that for a specific population of producers who have received

intensive risk management training, the overall trends in utilization of these marketing tools is increasing. In addition, farmers and ranchers who have stopped using futures and options markets report an increased use of other price risk management tools such as cash contracting, crop insurance, and marketing pools. A focus on understanding and using futures and options markets continues to be a viable component of risk management education.

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- Mark Welch (jmwelch@tamu.edu) is Assistant Professor and Extension Economist, David Anderson (danderson@afpc.tamu.edu) is Professor and Extension Economist, John Robinson (JRCR@tamu.edu) is Professor and Extension Economist, Mark Waller (MWaller@tamu.edu) is Associate Head for Extension and Program Leader in Agricultural Economics, Stan Bevers (s-bevers@tamu.edu) is Professor and Extension Economist, Rob Hogan (rhogan@ag.tamu.edu) is Assistant Professor and Extension Economist, Steve Amosson (samosson@ag.tamu.edu) is Professor and Extension Economist, Dean McCorkle (d-mccorkle@tamu.edu) is Extension Program Specialist, Jackie Smith (j-smith34@tamu.edu) is Professor and Extension Economist, and Emmy Williams (emmywilliams@tamu.edu) is Extension Program Specialist, all in the Department of Agricultural Economics, Texas A&M University, College Station, Texas.*

# Does E-Commerce Help Agricultural Markets? The Case of MarketMaker

Carlos E. Carpio, Olga Isengildina-Massa, R. David Lamie, and Samuel D. Zapata

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**E**-commerce refers to the use of the Internet to market, buy and sell goods and services, exchange information, and create and maintain web-based relationships between participant entities (Fruhling and Digman, 2000). Based on its demonstrated impact in industrial retail markets (Elia, Lefebvre, and Lefebvre 2007), e-commerce is believed to have the potential to increase profitability in agricultural markets by increasing sales and decreasing search and transactions costs. The creation of electronic markets that are expected to be more transparent and competitive than physical markets may attract more consumers by increasing demand and improving the firm's strategic position with customers seeking specific niche products or having geographical restrictions (Batte and Ernst, 2007; and Montealegre, Thompson and Eales, 2007). However, due to the relatively new state of e-commerce in agriculture, its impact has not been widely measured and documented. We developed an evaluation framework and applied it to measuring the performance of the agricultural e-commerce platform MarketMaker. The analysis focuses on the impact of MarketMaker on producers and farmers' markets and consists of both the perceived impacts based on survey responses and a willingness-to-pay analysis, as well as the examination of factors that affect the impacts of the website. Our findings provide guidance for future development of agricultural e-commerce-enabling platforms like MarketMaker, as well as future evaluation efforts of these platforms.

## What is MarketMaker?

MarketMaker is an interactive e-commerce platform that provides food marketing information to food

entrepreneurs—agricultural producers, buyers, processors, wholesalers, food retailers, restaurants—and their customers. The site was created in 2000 by a team of University of Illinois Extension personnel with the goal of building an electronic infrastructure that would easily connect Illinois food producing farmers with economically viable new markets. In 2005, a multi-state partnership of land grant institutions and agriculturally focused organizations was formed to build a national network of interconnected MarketMaker sites. By December 2012, 19 states and the District of Columbia became part of the national network (Table 1). The site currently includes nearly 660,000 profiles of food-related enterprises including 8,618 agricultural producers and experiences about 1 million hits per month from over 85,000 users. The original MarketMaker project was funded by the Illinois Council on Food and Agricultural Research and the Illinois Department of Agriculture. As other states have joined the MarketMaker network, funding has typically come from state departments of agriculture and land grant universities along with other sources such as Sea Grant.

MarketMaker provides information about product availability by geographic location and market orientation to help inform decisions of both producers and consumers. As an electronic farm directory/food marketing tool, MarketMaker directly competes with other websites such as Local Harvest, Eat Well Guide, Rural Bounty, Local Farm Link, Chef Collaborative, Agricultural Business, Green People, Pick Your Own, various state locally grown promotion websites, Farm Bureau, local food directories supported by a host of local organizations, and directories provided by state departments of agriculture. Different from



**Table 1:**

Table 1						
Types of Businesses Participating in MarketMaker as of December 2012 <sup>a</sup>						
State	Year of Joining MarketMaker	Type of Business				Total
		Farmers/Producers	Non-Farm <sup>b</sup>	Farmers' Markets	Wineries	
Alabama	2011	50	19,197	14	0	19,261
Arkansas	2010	100	10,805	53	8	10,966
Colorado	2009	556	23,973	105	83	24,717
Florida	2010	259	76,112	163	18	76,552
Georgia	2007	521	40,092	144	20	40,777
Illinois	2004	1,098	53,204	299	62	54,663
Indiana	2008	374	12,533	123	15	13,045
Iowa	2006	421	14,331	238	34	15,024
Kentucky	2007	461	14,275	174	16	14,926
Louisiana	2010	229	20,125	157	5	20,516
Michigan	2008	447	32,994	156	48	33,645
Mississippi	2007	226	12,104	73	1	12,404
Nebraska	2006	700	7,527	80	9	8,316
New York	2007	1,578	95,158	547	208	97,491
Ohio	2008	480	43,946	194	89	44,709
Pennsylvania	2010	258	53,271	58	19	53,606
South Carolina	2009	427	20,773	97	3	21,300
Texas	2011	414	86,363	201	47	87,025
Wyoming	2012	9	2,458	45	0	2,512
Washington, DC	2009	10	3,500	28	0	3,538
<b>Total</b>		<b>8,618</b>	<b>642,741</b>	<b>2,949</b>	<b>685</b>	<b>654,993</b>

<sup>a</sup>Businesses are not limited to one profile, and therefore may be counted multiple times (once for each profile).

<sup>b</sup>This category includes agritourism, buyers, processors, wholesalers, food retailers and eating and drinking places.

some food marketing websites, such as Local Harvest, MarketMaker does not have a selling feature, meaning that users cannot purchase products directly through the website. In contrast to farm directory websites, such as Rural Bounty, Chef Collaborative, Agricultural Business, and Pick Your Own, MarketMaker provides the benefit of displaying the information about food producers/retail outlets on a map. Moreover, MarketMaker provides the ability to map consumer data related to several demographic characteristics. Thus, for farmers, it provides information to help better target markets and identify potential businesses with which to collaborate. For consumers—households, processors, handlers, retailers, and wholesalers—MarketMaker provides information to help make decisions about where to purchase products or to identify business-to-business opportunities all along the supply chain.

Previous studies that looked at several aspects of MarketMaker performance reported that 63% of Ohio registered users including producers, farmers' markets, and wineries believed that the MarketMaker site was

helping keep more food dollars in the regional economy (Fox, 2009). Cho and Tobias (2009) found that the average increase in annual sales attributed to MarketMaker among 374 New York farmers was between \$225 and \$790. Additionally, 12% of the respondents reported receiving marketing contacts through MarketMaker and using the MarketMaker directory to contact other food industry business partners.

### Evaluation Framework

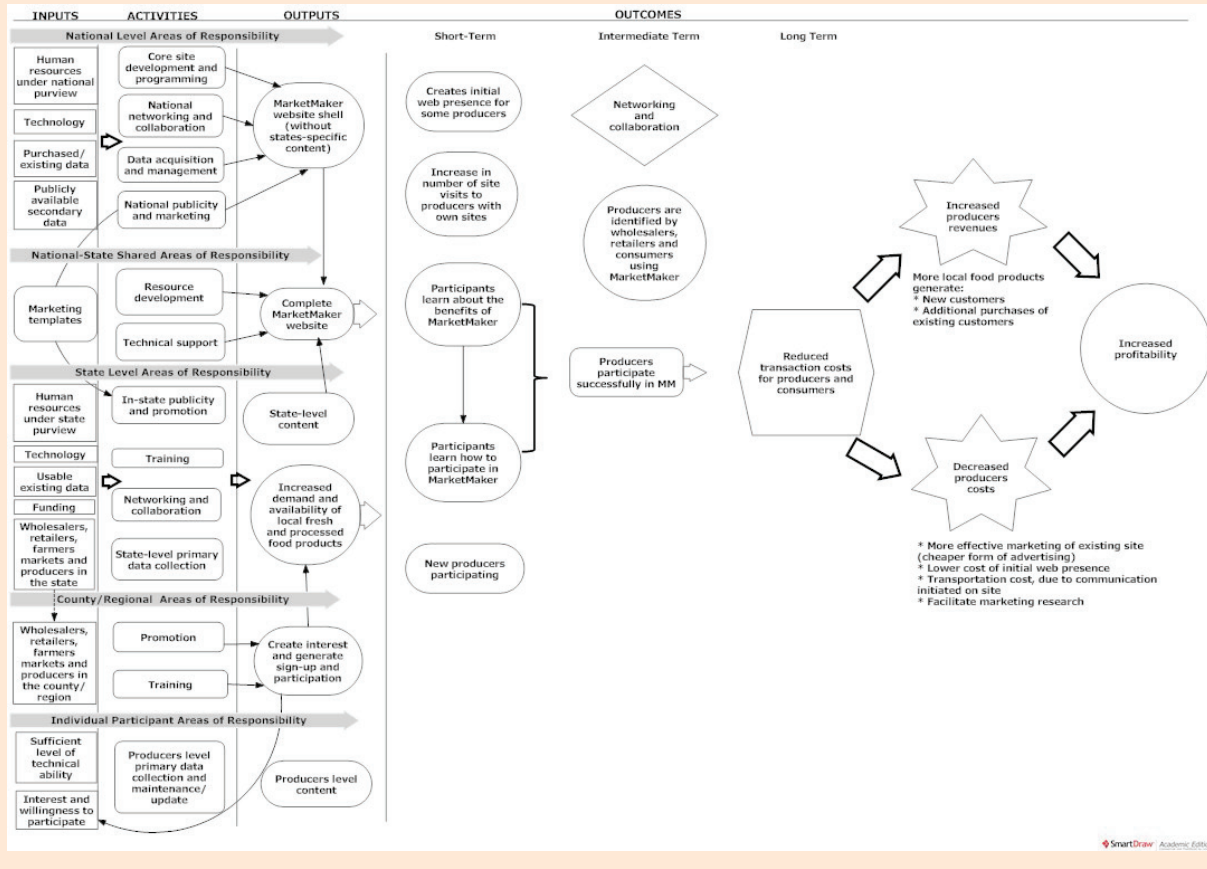
In order to more clearly understand how an e-commerce platform such as MarketMaker can produce useful results, one must consider more than the platform itself. A useful way to analyze the components of a complex program such as MarketMaker is to develop logic models which demonstrate the links between inputs, activities, outputs and outcomes of a program. Logic models also facilitate the identification of relevant evaluation measures and are frequently used as project planning and evaluation tools (W.K. Kellogg Foundation, 2004). Therefore, logic models were developed for each of the major identified

MarketMaker user groups (Lamie et al., 2011): producers, consumers, food retailers, food wholesalers, restaurants/chefs, and farmers markets. However, given funding constraints, only producers and farmers' markets were included in the current evaluation effort. Results from a survey of MarketMaker administrators and partners identified producers and farmers' markets among the primary users of the website. Farmers' markets were also included due to their growing importance as an alternative food distribution system connecting producers and consumers.

The logic model for producers is presented in Figure 1. The inputs on the national and state levels of MarketMaker include human resources; adequate technological expertise to support program requirements; funds to support planned activities—training, promotion, and networking; and availability of related public and private data such as the National Census and survey data from independent studies. These inputs are used to conduct a series of activities such as developing, updating and improving content, and usability and functionality of the platform. MarketMaker purchases, gathers, manages, and distributes relevant existing data such as consumers' socio-demographic characteristics. MarketMaker also conducts training and promotional sessions at national, state, and regional levels in order to create awareness and prepare producers to successfully participate in MarketMaker. The adequate combination of inputs and activities leads to accomplishing the desired outputs, which include the complete MarketMaker website as well as the registration and participation of new producers in the MarketMaker program.

The outcomes of the platform, which we believe should be the main focus of the evaluation efforts, can be classified as short-, intermediate-, and long-term. In the case of

Figure 1: MarketMaker Producer Logic Model



MarketMaker, short-term outcomes comprise the creation of an initial web presence for some producers, additional web presence for others, and active participation in the site. In the intermediate-term, producers should be easily identified by wholesalers, retailers, and other consumers who choose to use MarketMaker. In the long-term, MarketMaker portends to assist producers to increase profitability as a result of reduced marketing transaction costs and increased revenues via increased purchases from new and existing customers. The tested logic model outcomes can be used to identify quantifiable metrics. For example, the time and other resources a business devotes to the management of MarketMaker can be used as measures of short-term outcomes. The number of new contacts and new customers can be used as metrics of

intermediate-term outcomes. The changes in total sales and marketing costs or changes in profits can be used as metrics for long-term outcomes of the platform. We followed a similar approach for the development of the logic model for the farmers' markets segment of users and the subsequent identification of quantifiable evaluation metrics.

### MarketMaker Impact on Producers and Farmers' Markets

The data on the metrics describing the impact of MarketMaker on producers was collected through a survey that was distributed by email and postal mail to 4,264 producers registered on MarketMaker between April 2011 and March 2012. The farmers' market managers' survey was distributed by email to 1,295 managers registered on MarketMaker websites

(May–June 2011). Both surveys were distributed in all 15 participating (as of 2010) states: Arkansas, Colorado, Florida, Georgia, Illinois, Indiana, Iowa, Louisiana, Michigan, Mississippi, Nebraska, New York, Ohio, South Carolina, and Washington D.C. The response rates were 18% for producer survey and 10.2% for farmers' market managers' survey.

Survey results (discussed in more detail in Zapata et al., 2011; and Carpio et al., 2013) indicate that the perceived impact of MarketMaker on producers and farmers' markets outcomes are presently relatively modest (Table 2). As a result of their participation with MarketMaker, producers have received an average of 2.9 new marketing contacts, and have gained an average of 1.6 new customers. Additionally, MarketMaker has assisted producers in increasing their annual

sales by an average of \$152. Nearly 87% of producers registered in MarketMaker participate in direct marketing to individual consumers and wholesale buyers. MarketMaker has helped these producers receive an average of 2.9 new marketing contacts and increase their annual direct sales to individual consumers by 1.1% and to wholesale buyers by 0.8% on average. Our findings for farmers' markets indicate that, as a result of their participation with MarketMaker, managers have been contacted, on average, about 1.6 times by customers and vendors, and obtained an average

of 0.8 new vendors and 1.9 new customers. The average annual increase in sales due to participation in MarketMaker was estimated at about 3.6%, or \$4,889 per farmers' market.

These reported averages, however, mask substantial variability across survey respondents. We found that the perceived impacts of MarketMaker on producers tend to be positively related to self-registration in MarketMaker, the amount of time since registering on the site, and the amount of time users spend on MarketMaker activities. In fact, producers who registered themselves on the

MarketMaker website (83% of respondents) have received, on average, almost twice as many additional contacts and customers than those who were registered by someone else or do not know how they were enrolled in MarketMaker. Registration by others can occur if an existing list of producers—usually the one maintained by a state department of agriculture—is used to populate the MarketMaker database. Self-registered users are very likely to be more aware of their business presence on the site which facilitates the attribution of additional contacts and sales to it. It is also possible that the quality of the information provided by self-registered producers is more accurate and up to date.

Producers who spend between 30 and 60 minutes per month (12% of sample) on the MarketMaker website have an average annual sales increase of \$242 compared to only \$32 for those users who spend less than 30 minutes a month (83% of the sample) on MarketMaker-related activities. The most used site features include “logging on to check or update profile,” “searching for products,” and “searching for buyers and sales opportunities.” Less commonly used features include “searching for business partnerships,” “using of the buy/sell Forum,” and “finding target market for your products.” These findings about farmers' registration and use intensity suggest that more education and promotion of MarketMaker is needed to encourage self-registration and more active use of MarketMaker to achieve the desired benefits from participation.

Our analysis of factors that affect the increase in farmers' markets sales due to MarketMaker revealed the components needed for more successful use of MarketMaker by the farmers' markets, namely, the established MarketMaker program, the established farmers' market, and the active user-manager. Thus, the track record in the states with a longer presence

**Table 2:**

Table 2 Perceived Additional Marketing Contacts, New Customers and Increase in Annual Sales as a Result of Producer and Farmers' Market Participation in MarketMaker.					
Variable Name	Category	Producers		Farmers' Markets	
		Category Proportion	Mean	Category Proportion	Mean
Additional Marketing Contacts	0	64.17	2.90	69.33	1.45
	1 to 9	28.35		28.00	
	10 to 20	5.14		2.64	
	21 to 30	1.56			
	31 to 40	0.47			
	41 to 50	0.16			
	More than 50	0.16			
New Customers	0	70.15	1.62	63.41	1.86
	1 to 10	27.40		31.71	
	11 to 20	1.63		2.44	
	More than 20	0.82		2.44	
New Vendors	0			76.40	0.81
	1 to 4			19.10	
	5 to 10			4.49	
Increase in Annual Sales (\$)	Under \$25	74.54	151.65	N/A	N/A <sup>1</sup>
	\$25 to \$50	6.46		N/A	
	\$51 to \$75	2.40		N/A	
	\$76 to \$99	4.06		N/A	
	\$100 to \$499	7.75		N/A	
	\$500 to \$999	2.58		N/A	
	\$1,000 to \$4,999	1.85		N/A	
	\$5,000 to \$9,999	0.00		N/A	
	More than \$10,000	0.37		N/A	
Increase in Annual Sales (%)	No increase	N/A	N/A	42.86	3.57
	1% to 10%	N/A		50.00	
	10% to 19%	N/A		7.14	

Note: Marketing contacts, new customers and new vendors refer to the total contacts, customers and vendors gained since the user became registered on the MarketMaker website.

<sup>1</sup> N/A stands for not available

on MarketMaker demonstrates the program's potential for new users. The fact that more established farmers' markets are able to achieve higher increases in sales than the new ones suggests that MarketMaker is possibly more effective in expanding existing markets rather than helping create new capacity. Finally, higher sales among more active users indicates that, in order to see the impact of MarketMaker on their operations, users have to invest time and effort in making the program work for them.

### **Willingness to Pay for Market Maker**

Since the long-term MarketMaker outcome for producers is an increase in profitability, we also asked producers the following hypothetical question regarding their willingness to pay for the services provided by MarketMaker: "If MarketMaker becomes privately funded, while retaining all the features and services it currently provides, would you be willing to pay an annual participation fee of \$X for the services you receive from MarketMaker?" (Carpio et al., 2013). The willingness to pay (WTP) measure derived from the question is directly related to the increase in profits obtained from using the site (Zapata, 2012; and Hudson and Hite, 2003). The survey results indicate that, on average, producers are willing to pay \$47.02 annually for the services they receive from MarketMaker. Willingness to pay analysis for the subsample of farmers' markets revealed that managers are willing to pay an average of \$41.19 annually for the services provided by MarketMaker. Theoretically, this value reflects the value users assign to the entire basket of MarketMaker services. The estimated mean WTP for farmers' markets comprised about 1% of their perceived increase in sales estimated in this study.

Our findings indicate that registration type, time registered on MarketMaker, time devoted to the website,

type of user, the number of marketing contacts received, and firm total annual sales have a significant effect on producers' WTP for the services provided by MarketMaker. Thus, the effectiveness of MarketMaker is strongly linked with how it is used by producers after registration. For example, WTP is positively related to the time devoted to MarketMaker activities after registration. The positive relationship between the time producers have been registered on the site and the stated WTP implies that the benefits associated with MarketMaker tend to increase over time. Results of this research also indicate that additional marketing contacts increase producer WTP. Hence, with the aim to increase the number of marketing contacts received, MarketMaker website development should focus on encouraging producers to frequently update their site profiles, specifically their contact information—phone number, email, website URL—and products' attributes and availability. Ultimately, these findings provide valuable information for current and potential users trying to better understand the expected costs and returns from a wide range of marketing, promotion, and other competing e-commerce activities.

### **Lessons for Future E-Commerce Development and Evaluation**

The systemic approach to MarketMaker evaluation undertaken in this study offers several important lessons for future development and evaluation of e-commerce in agriculture.

1. E-commerce offers an alternative venue of promoting and marketing agricultural products that has a benefit of reaching extensive geographical populations and providing detailed product information at a relatively low cost.
2. The costs of an e-commerce platform are not limited to user participation costs and include website development, support, and

training and promotion costs and, therefore, tend to be frontloaded. On the other hand, the benefits tend to increase over time as more producers and consumers become more familiar and active users of the platform.

3. The benefits of an e-commerce platform include new or additional website presence in the short term, new contacts and new customers in the intermediate term, and ultimately higher profitability in the long term.
4. Active user participation is critical to achieving the desired benefits from participation. Due to the pattern of front-loaded costs and back-loaded benefits, e-commerce platforms are likely to show negative net returns in the early stages, but the track record of the more established programs shows the potential for new ones.
5. Attribution effects—credit given to MarketMaker for additional contacts and sales—may mask the benefits of e-commerce; therefore, every effort should be taken to improve the visibility of MarketMaker effects.
6. Electronic collection of information about website users as well as the application of homogeneous evaluation approaches, such as the one developed in this study, will facilitate future evaluation efforts.

MarketMaker and similar sites offer a way for businesses to gain inexpensive initial web presence, allowing them to be "known" to the rest of the world. MarketMaker differentiates itself from other websites because of its ability to map consumer and producer-related data. The platform has been supported by the land grant Cooperative Extension programs in participating states, as well as other state public and private agricultural organizations. The long-term potential benefits of MarketMaker to producers, farmers' markets, and other user



groups are now beginning to become evident. But, it is too soon to tell just how extensive these impacts will be. Much depends on the continued commitment of the program partners—and the users themselves—to turn this latent potential into realized net benefits. Perhaps the frameworks and initial analyses created under the scope of this study will help facilitate the execution of appropriate actions necessary by all parties, working in unison, to derive these benefits.

Since its creation in 2000, MarketMaker has offered its electronic infrastructure and resources to registered users at no cost. Federal and state governments have provided most of the funding for the initial platform development and maintenance. Public investment in this “cyber-infrastructure” project can be justified if some benefits also accrue to the public through increased access to a more efficient, transparent, and robust food supply chain. However, in this era of fiscal austerity, this financing model may not be sustainable. If this project were fully privately funded by an individual food supply business, it is possible that consumer acceptance and producer participation would be thwarted. Funding through a collection of associations, and public-private or non-profit public benefit-oriented groups that represent private interests is a possible alternative, so long as these groups represent a broad cross-section of food supply chain businesses and possibly even consumers. For certain, potential funders should fully recognize that substantial in-kind financial and other support has come from state-level institutions including (e.g., land grant universities, departments of agriculture). Involvement of these organizations has facilitated the connection of the platform with producers and consumers which might be harder to achieve for a private organization.

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*Carlos E. Carpio (carlos.carpio@ttu.edu) is Associate Professor, Department of Agricultural and Applied Economics, Texas Tech University, Lubbock, Texas. Olga Isengildina-Massa (isengild@uta.edu) is Associate Clinical Professor, Department of Economics, University of Texas at Arlington, Arlington, Texas. R. David Lamie (dlamie@clemson.edu) is Associate Professor, School of Agricultural, Forest and Environmental Sciences, Clemson University, Clemson, South Carolina. Samuel D. Zapata (samueldzapata@gmail.com) is a former Graduate Research Assistant, The John E. Walker Department of Economics, Clemson University, Clemson, South Carolina.*

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## Food Product Liability Insurance: Implications for the Marketing of Specialty Crops

Kathryn A. Boys

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The growth of the market for specialty crops may have been hindered in recent years by concerns about food safety. The U.S. Centers for Disease Control and Prevention (CDC) estimates that 48 million instances of foodborne illnesses occur each year resulting in 128,000 hospitalizations and 3,000 deaths (CDC, 2012). Of those with an identified cause, 46% of illnesses and 23% of deaths are attributable to illness acquired through produce consumption (Painter et al., 2013). Overall medical costs, productivity losses, and the costs of premature deaths due to identified and unspecified cases of foodborne illness have recently been estimated to be a staggering \$51.0 billion annually (Scharff, 2012).

To mitigate these risks, public and private sectors have responded with new regulations, certifications, and standards. Key among such initiatives is the Food and Drug Administration (FDA) Food Safety Modernization Act (FSMA) signed into law in January 2011. While this Act is intended to improve food safety, some argue it lacks sufficient reach or addresses the wrong issues (Conroy, 2011). Further, the FSMA's Tester-Hagan Amendment modified food safety requirements for small- and medium-scale (SMS) farms that locally sell more than 50% of their produce directly to consumers, food retailers, or restaurants. While this exemption is intended to reduce the regulatory burden on small- and medium-size producers, some food buyers feel that, with this exception, there is insufficient assurance of food safety practices from SMS producers.

Further, although firms may be duly diligent and meet or even exceed accepted food safety protocols, food could still become contaminated by an upstream supplier. In

such cases, the final seller of the finished product and the organizations facilitating the sale of that product may be held (jointly) liable for damages resulting from that hazard. As a result, an increasing number of businesses now require food suppliers to carry food product liability insurance (FPLI) to provide protection in the event of injury to a user that may arise from the consumption, handling, use of, or condition of products manufactured, sold, handled, or distributed by producers. Larger foodservice establishments including schools and hospitals, food retailers, farmers' markets, and kitchen incubators are increasingly requiring their suppliers, or those who supply through them, to carry this insurance product.

General barriers and food safety challenges in marketing specialty crops to institutional foodservice establishments have been recently explored through several research projects in the U.S. Southeast region. These projects examined marketing channel constraints and challenges from the perspectives of both SMS specialty crop farmers, and those buying and facilitating the sale of these crops. Study of this issue began with two series of focus groups held in North Carolina, South Carolina, and Georgia with groups of (1) farmers, and (2) food buyers and market facilitators. Uncertainty concerning food safety regulations and practices, and challenges with finding and financing FPLI are among the key concerns noted by farmers. Large group meetings were then held with stakeholders from throughout the SMS farm-to-institution specialty crops marketing channel to identify and evaluate possible solutions to the identified challenges.

Surveys of SMS producers, and school and hospital foodservice buyers were subsequently conducted to obtain quantitative insight into the qualitative findings. SMS specialty crop farmers from throughout the Southern-Sustainable Agriculture Research and Education (SARE) program region (the Southeastern United States includes states from Virginia to Texas) were surveyed electronically. Responses from school and hospital foodservice buyers from North Carolina, South Carolina, and Georgia were collected via a mailed paper survey. Additional details of the research methodology and results from the qualitative research phase, the producer survey, and the institutional foodservice buyer survey are documented in Westray (2012), Du-Breuil (2013), and Nunnolley (2012), respectively. The following discussion draws upon results from these studies.

### The Demand for Food Product Liability Insurance

It is important to ensure that specialty crop producers are sufficiently motivated to provide safe food products. Literature shows that, in conjunction with liability rules designed to decrease incentives for insured firms to take on increased risk (moral hazard), or which reduce risk information asymmetry between producers and insurers (adverse selection), insurance can provide incentives to supply efficient levels of food safety (e.g., Turvey, Hoy and Islam, 2002; and Mojdzuska, 2004). In practice, however, it is unlikely that this insurance product will motivate these outcomes. Qualitative results indicate that institutional food buyers and farmers' market managers are generally unaware of the extent of their organization's liability (Westray, 2012). For these buyers and market facilitators, in many instances it was reported that insurance coverage requirements were determined through hearsay of requirements by other groups rather

than any assessment of a producer's or a product's risk. Industry groups and non-governmental organizations (NGOs) have not offered sufficient guidance concerning what coverage amounts should be required of suppliers. Importantly, however, a significant proportion of organizations who noted that FPLI is not currently a supplier prerequisite are considering instituting it as a requirement.

In cases where FPLI is already an established requirement, the amount of required coverage was found to vary considerably. Surveys of public school and hospital foodservice buyers reported that a majority of organizations had coverage requirements between \$1 million and \$3 million, but that this amount ranged from \$100,000 to between \$5 million and \$10 million (Table 1). These results are generally consistent with findings of a U.S. Department of Agriculture (USDA) study which found that food product liability insurance coverage requirements for schools varied by school district and were between \$100,000 to \$3 million (USDA Agricultural Marketing Service, 2011).

In a substantial number of cases, buyers did not know their organization's coverage requirements. Further and interestingly, all hospitals and 80% of schools who reported that they did not know what amount of insurance was required, indicated that proof of product liability insurance would be required from any

farms selling directly to them.

Larger buyers, such as regional or national food retailers, were reported to have insurance coverage requirements ranging from \$2 million to \$5 million. Unsurprisingly, in this market there appears to be a positive correlation between the size of the buying firm and its FPLI coverage requirements.

### Buying Food Product Liability Insurance

In a recent survey of small- and medium-scale specialty crop farmers in the U.S. Southeast region, 38% of respondents (n=258) indicated that they currently have FPLI. Their motivation for purchasing this insurance product varied, but generally was due to liability concerns (74% of policy holders), buyer requirements or requests (32%), or as an intentional part of their marketing strategy (14%). This latter result is particularly important. Firms reported that they viewed purchasing this insurance as helping to support their firm's reputation (20.2%), adding value to their products (7.1%), and helping to distinguish their products from that of their competitors (5.1%). Thus until it is more widely adopted, this insurance product may effectively be included as a component in a firm's marketing or differentiation strategy.

Farmer opinion regarding this insurance further reinforces the

**Table 1:**

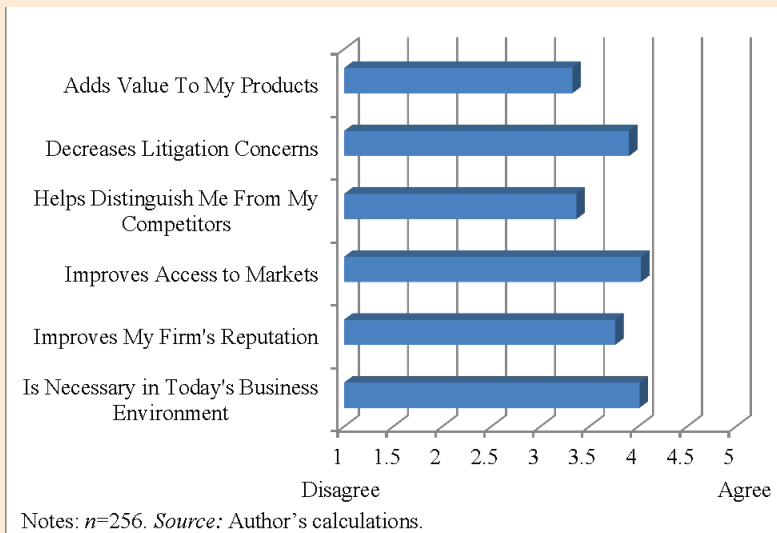
Insurance Requirements	Public Schools (K-12)		Hospitals	
	Respondents (#)	% <sup>a</sup>	Respondents (#)	% <sup>a</sup>
Less than \$1 million	10	20	3	15.8
\$1 million to \$3 million	35	70	11	57.9
\$3 million to \$5 million	3	6	2	10.5
\$5 million to \$10 million	2	4	3	15.8
Greater than \$10 million	0	0	0	0
Do not require FPLI	5		3	
Don't know	51		25	
Total Observations	106		51	

Notes:

<sup>a</sup> Percentage calculated from among respondents who knew FPLI coverage requirement amounts

Source: Author's calculations

**Figure 1: Small and Medium Scale Specialty Crop Farmer Opinion Concerning Attributes of Food Product Liability Insurance**



perceived multi-functionality of this product. When indicating the extent to which they agreed with statements about FPLI, responses concerning its role in decreasing litigation concerns and market access, elicited some of the strongest opinions (Figure 1). Importantly, however, here again marketing strategy impacts, and in particular the assurance that this insurance is thought to provide for a firm's reputation, were strongly rated.

Procuring this insurance is often not without its own challenges. Of those who provided information regarding their insurance purchasing process (n=88), many (26.1%) noted challenges in identifying firms that would insure against this risk. On average farmers reported contacting 2.4 companies to get insurance premium quotes; about half of these companies were not able to provide FPLI policy quotes. Farmers who are currently insured by companies that offer this form of insurance though, reported it was relatively easy to add this coverage to their existing policy bundles (9.0%).

Availability of this insurance coverage, however, varies considerably across regions. Many buyers (9.6%)

reported approaching five or more insurance companies before they were able to obtain a single quote. Further, several farmers indicated that they ultimately hired an insurance broker or approached state departments of agriculture for assistance in identifying companies which offered this insurance product. Other noted procurement challenges were the expense of this insurance (7.9%), low coverage limits, and exclusions (e.g. for "communicable diseases") which were standard on many policies.

From these studies we also learned that food product liability insurance was noted among the most concerning and least understood business issues among specialty crop producers. In general, prior to providing respondents additional information, there was considerable confusion regarding the difference between FPLI and standard liability insurance. Farmers are relatively uninformed about the need for this insurance and to what extent, if any, they have coverage for this type of liability. Moreover, several respondents stated that they would have no need for this insurance due to their good on-farm handling practices. Clearly there is much need for additional Extension efforts on this topic.

## Food Product Liability Insurance Market

The FPLI market for SMS diversified specialty crop producers is in its infancy. The insurance coverage being required by buyers of specialty crops varies considerably, and findings from our qualitative research (Westray, 2012) suggests coverage requirements are not correlated with the true risk of foodborne disease of the products being purchased. Further, those supplying this insurance product are not sufficiently familiar with foodborne disease risks associated with various specialty crops. As a result, insurance premiums have been reported to vary widely for similar coverage for farms that have very similar risk and output profiles. Here also there is a need for Extension efforts and insurance industry education.

It is important to note also that the provision and administration of product liability insurance is very different than that of crop insurance. Crop insurance is offered through a private-public partnership. Agents of private insurance companies sell and service crop insurance policies. The Federal Crop Insurance Corporation (FCIC) reinsures these policies and the USDA Risk Management Agency (RMA) administers and oversees all programs authorized under the FCIC. For this program, a limited amount of regulatory responsibility is delegated to each state (Klein and Krohm, 2008). In contrast, there is no uniform, comprehensive Federal law governing product liability, including that for farm and food products, in the United States (Buzby and Frenzen, 1999). Instead, individual states have jurisdiction over product liability law. As a consequence, the regulations governing FPLI and legal actions arising from foodborne illnesses that are governed by state laws often vary considerably.

The specific insurance lines of business under which FPLI is covered varies considerably as well. Farm

owners multiple peril, homeowners multiple peril, commercial multiple peril, other liability - occurrence, and other liability - claims are some of the more common business lines under which product is insured. These lines of business differ, however, in the categories of items they cover. Coverage per occurrence or per year may be limited and is likely to vary across lines. Such details would clearly be important in the event of a food safety incident.

Accounting for coverage differences across and within various insurance lines makes it difficult to disentangle the premium amount specifically attached to FPLI. Indeed, when asked, at best most producers could cite only rates reflecting their whole bundle of liability insurance. Holland (2007) made some progress in exploring this issue. Based on an informal survey of insurance providers conducted in 1998, he reported that the annual premiums for FPLI ranged from \$500 to \$20,000 for a \$1 million policy. The average food product liability premium was found to be \$3,000 for a \$1 million annual policy. The most significant factors contributing to the premium charged were: level of gross sales or annual payroll, prior claims (claims history), level of coverage, type of product, type of market, and recall plan. There were no "standard rates" for liability coverage for food products. The actual premium depended on the many "specific" characteristics of the product and the firm's value added and marketing plans.

Despite the difficulty often reported in obtaining multiple quotes, our results suggest that it does pay to shop around. Many anecdotal examples were shared of the significant variance in quoted rates for farms with very similar risk profiles. Similarly, significant premium variance was noted by producers in obtaining multiple quotes for the same location. One respondent reported, for

example, that quotes for the same \$1million coverage on his/her farm varied from \$250 to \$1,500. Alternatively, producers could join a marketing or distribution network which offers this insurance as a service to its members. Markley (2010) documents several such case examples, and several respondents noted that they were required to participate in a group FPLI policy as a condition of selling at certain farmers' markets. When insurance is provided through such groups, however, it provides coverage only for products marketed through those organizations.

### Concluding Observations

The financial burden of foodborne illness outbreaks has historically been borne by firms in both suspected and the actual industries at fault for the incident. Increased use of traceability practices allows the cost of food safety incidents to be more targeted and increasingly borne by the implicated firms. In an effort to mitigate against potential liability in the face of such an incident, firms are increasingly requiring that their suppliers have food product liability insurance coverage. This requirement, however, has important implications for the success and profitability of specialty crop producers. Producers purchasing this insurance incur a new and oftentimes substantial fixed cost. Entire marketing channels may be closed to those who do not or cannot purchase such insurance. These concerns are particularly important for small- and medium-sized producers. These farmers frequently are financially constrained and, due to their relatively small volume of production and logistic constraints, already may have difficulty accessing many institutional or commercial foodservice markets. Therefore, inefficiencies associated with food product liability insurance could effectively increase the cost of specialty crop production, while at the same time limiting the ability of producers

to sell products even through direct marketing channels. As a result, revenues and profitability could decline and, in some cases, viability of some producers could be affected.

There is, of course, the option for SMS farms to remain uninsured. Even if FPLI was not a requirement, however, a single incident of foodborne illness outbreak attributed to a SMS farm would likely have serious negative financial impacts on both the originating farm and those in the surrounding community. Buzby, Frenzen, and Rasco (2002) found that where awards were made in jury adjudicated cases of food poisoning, the median amount awarded was \$25,560. Without insurance then, a single foodborne illness incident attributed to a SMS farm could foreseeably force a business shutdown. Further, such an event could also have significant and negative impacts on consumer confidence in that locality's food system. Given the significant mobilization of investment and effort dedicated to increase the consumption and sourcing of fresh fruits and vegetables from SMS producers (e.g. USDA Women, Infants, and Children (WIC) Farmers Market Nutrition Program (FMNP), USDA Farm to School Grant Program), inflated costs and limiting market access for specialty crop producers due to liability insurance market inefficiencies is directly counter to the public interest and welfare. Efforts are needed to better inform all stakeholders in this emerging market about the real risks associated with food product liability.

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*Kathryn A. Boys (kboys@vt.edu), is an Assistant Professor, Department of Agricultural and Applied Economics, Virginia Tech, Blacksburg, VA.*

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