

Cornhusker Economics

Successful Extension Meetings and Innovative Economic Research: Grain Marketing Simulations

Market Report	Year Ago	4 Wks Ago	10-14-16
Livestock and Products,			
Weekly Average			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.	133.04	110.00	97.40
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb.	221.45	152.86	126.96
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.	198.89	141.68	132.73
Choice Boxed Beef, 600-750 lb. Carcass.	209.46	186.48	182.43
Western Corn Belt Base Hog Price Carcass, Negotiated	69.04	54.03	47.14
Pork Carcass Cutout, 185 lb. Carcass 51-52% Lean.	88.26	80.04	72.41
Slaughter Lambs, woolled and shorn, 135-165 lb. National.	159.30	160.13	150.90
National Carcass Lamb Cutout FOB.	359.98	355.69	.56.94
Crops,			
Daily Spot Prices			
Wheat, No. 1, H.W. Imperial, bu.	4.03	2.74	2.81
Corn, No. 2, Yellow Nebraska City, bu.	3.44	2.89	NA
Soybeans, No. 1, Yellow Nebraska City, bu.	8.33	9.11	NA
Grain Sorghum, No.2, Yellow Dorchester, cwt.	5.84	4.50	4.80
Oats, No. 2, Heavy Minneapolis, Mn, bu.	2.63	2.26	2.65
Feed			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.	180.00	145.00	160.00
Alfalfa, Large Rounds, Good Platte Valley, ton.	75.00	65.00	68.75
Grass Hay, Large Rounds, Good Nebraska, ton.	77.50	70.00	67.50
Dried Distillers Grains, 10% Moisture Nebraska Average.	115.00	120.50	109.00
Wet Distillers Grains, 65-70% Moisture Nebraska Average.	50.00	34.25	41.00
* No Market			

While grain marketing is considered a difficult challenge facing producers every year, it represents a very important component for producers to convert their bushels into dollars and ensure farm survival. Grain marketing involves both strategic behavior and knowledge of the grain market. Local and global supply and demand conditions, grain storage costs, transportation costs etc. present constantly changing risk and reward opportunities for producers. Efficient training and consistent monitoring of the market can help producers reduce risk (i.e., reduce the chance of farm failure) by making good use of pricing opportunities. Since these concepts may not necessarily be intuitive and strategic behavior can often be cognitively taxing, the University of Nebraska-Lincoln has developed an interactive grain marketing simulation game, called Marketing in a New Era (MINE) for this purpose. The first section of this article describes how the MINE simulation game can fit Extension meetings and help Specialists communicate grain marketing principles. The second section describes two example activities from the pre-harvest and post-harvest version of MINE. Screenshots from the simulation interface are included in order to portray how MINE works and why its design enhances the learning process. In the last section, a research idea is proposed that combines Experimental Economics techniques with Grain Marketing intuition, and uses MINE simulation as an experimental tool.

Marketing in a New Era: An Interactive Tool

Every year the goal at many Extension meetings is to help producers revise some common perceptions regarding marketing strategies such as the reluctance towards pre-harvest marketing, the failure to under-

stand basis behavior, the lack of an exit-strategy and the tendency to hold grain in storage too long (Usset, 2010). To help with these issues, educators often think of marketing in two distinct segments: pre- and post-harvest. In Pre-harvest marketing, the time horizon is long (typically the growing season) and producers have the opportunity to take advantage of expected price patterns containing production uncertainty to improve average price while reducing price risk. In post-harvest marketing, prices represent a signal from realized local and global market conditions (Usset, 2010). Successful post-harvest marketing requires producers to be able to understand the information that prices entail in order to secure a better price for their grain.

Simulations in agricultural courses have been a tool more common in extension presentation environments (Stewart et al., 2000). The substantial difference of the games/simulations compared with conventional methods such as lectures or seminars is that through the game the participants experience various events and/or responses (Stewart et al., 2000).

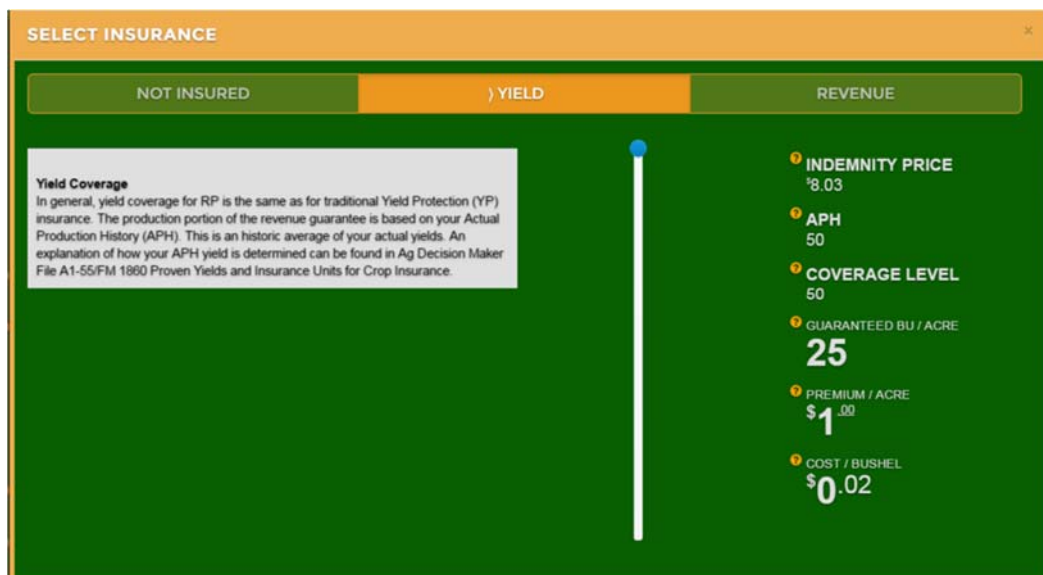
MINE allows Extension Specialists to demonstrate the marketing process, step by step starting from pre-harvest forward-looking strategies and ending with post-harvest tactical responses. It is a user-friendly tool that adjusts easily to audience's experience levels and needs. One unique feature in MINE is that simulations are based upon previously experienced historical future price series in conjunction with changing basis values. Another unique feature is the ability to trade multiple cash, futures and basis contracts simultaneously. Also unique is the fact that in an extension presentation, producers, along with the Extension Specialist, specify the game settings together and they design scenarios that are as close as possible to their actual production environment. This is a crucial stage because by setting up the environment, producers have the opportunity to assist in developing farm characteristic components. This set up is intended to give producers the opportunity to improve the probability of a profitable grain marketing strategy, to gain insight into grain marketing principles, to get to know what other marketing producers do, as well as playing a scenario that is realistic and relevant to their farm environment. These important features improve realism, keeping producers' attention while maximizing learning.

Why MINE Is Learning-enhancing

This section describes two examples from pre-harvest and post-harvest MINE versions, to demonstrate how MINE works. These examples demonstrate the way that MINE is intended to reverse some of the common misunderstandings in grain marketing such as producers' reluctance to market before harvest as well as their tendency to keep grain stored too long.

As mentioned earlier, producers are reluctant to use pre-harvest marketing. Their most common argument is that the production risk is high and they don't know if they will be able to fulfill the contracts. However, there are crop insurance tools that allow them to price earlier with confidence. One of the game settings that producers have to specify is the insurance tool that they prefer to use. More specifically, they pick yield or revenue insurance as well as coverage level (Figure 1). This is an opportunity for the Specialist to explain the link between insurance and pre-harvest marketing and respond to producers' concerns. After the insurance parameters, producers have to set up the costs that they will face in the simulation. At this point the Extension Specialist analyzes the relationship between price and cost, and makes clear that the only way that producers could target a minimum price objective is to know their production costs well.

Figure 1: Selection of the type of insurance (yield or revenue).



In the post-harvest MINE simulation, producers identify the cost of storage. This is a very important feature in marketing post-harvest that producers tend to underestimate or to use in order to carry last year's marketing flows into the next year (Usset, 2010). The post-harvest MINE game aims to help producers under-

stand the pros and cons of keeping the grain stored and also realize that they need to set realistic price targets, otherwise they will keep their grain stored for years. Another important post-harvest component is the relation among cash price, futures price, and basis. The post-harvest MINE environment allows producers to experience how they should evaluate the information offered by each of these prices (cash, basis, futures).

After completing the configuration of the game, producers start *game play* where they face different prices from multiple contracts over time (Figure 2). Each scenario has a certain number of decision points (see calendar at top of Figure 2). At each decision point, a table with current and

future prices is displayed. Producers make decisions based upon the prices and once they complete their decisions, they move forward to the next decision point. MINE offers a *market analysis* to assist in decision making (Figure 3). At the end of the game, they review their individual results (Figure 4) as well as the other producers' results (Figure 5). Results are presented in a format to allow producers the opportunity to evaluate their performance relative to the maximum and minimum profits they can make with and without marketing. The Extension Specialist concludes the session with a discussion about the optimal strategy under the given prices and how producers could have reached it.

Figure 2: Price Table



Figure 3: Price Analysis Table



Figure 4: Producer's Individual Results

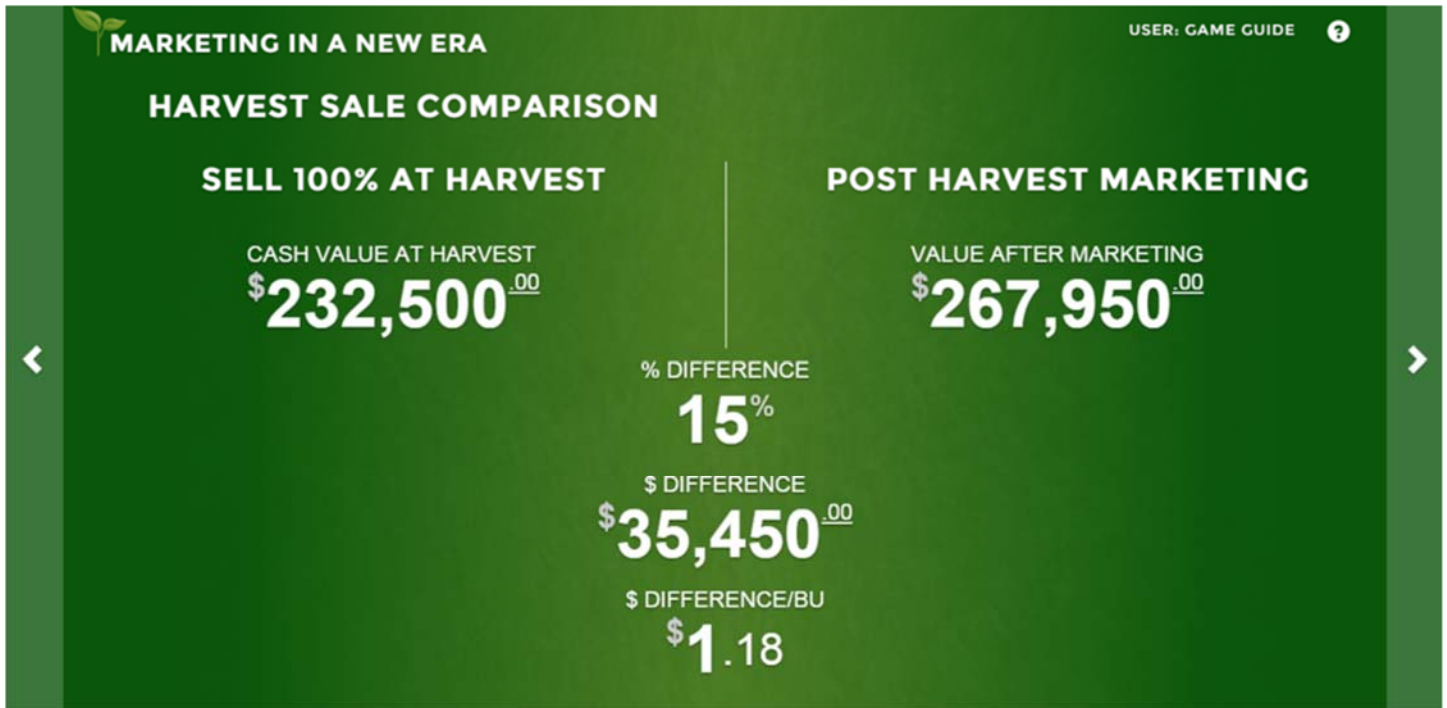
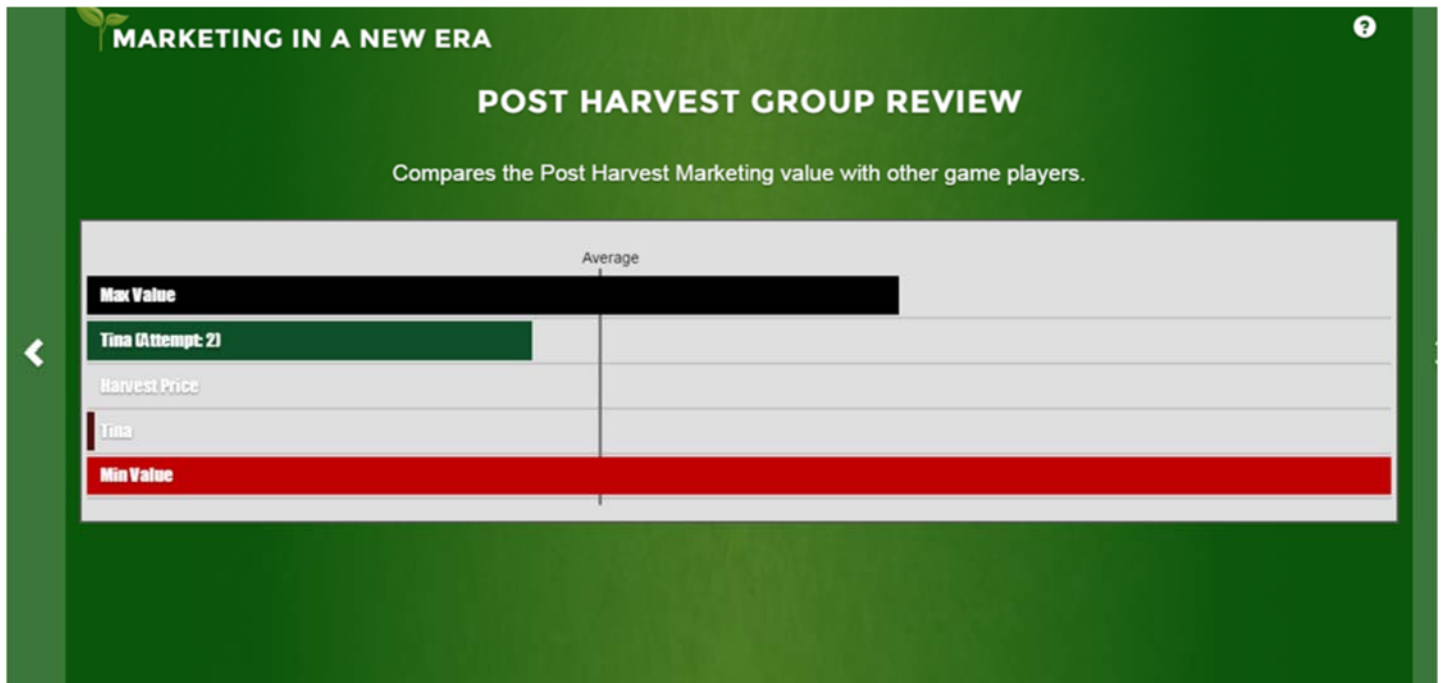


Figure 5: Group Summary Chart



MINE as a Research Tool

Simulation games have been widely used in experimental economics because both (games and economic experiments) focus on replicating the real world as faithfully as possible (Borawski, 2016). Because of their education-oriented character and ability to deploy within a large group of people, the simulation results have greater reliability. Moreover, economic experiments involving hu-

man subjects require their maximum engagement, which is difficult to achieve. Games are a useful tool to attract the subjects' attention (Borawski, 2016). Recent socio-technical developments involving computer games have created a new kind of research in the social and behavioral sciences (Bainbridge 2007).

Friedman, et al. (2007) tried to isolate the features that reinforce or discourage the sunk-cost fallacy by using a *Treasure Hunt* computer game. Participants were trying to find various amounts of *buried treasure* in several *islands*, and researchers measured if the cost of approaching an *island* influenced their insistence of finding the treasure. Kimbrough and Wilson (2013) used a virtual world to investigate the effect of an exogenous ecological shock on the informal principles of property and exchange. They tested how an ecological shock such as a severe drought can cause institutional evolution and replace the private property with new informal routines. Dorschner and Musshoff (2015) incorporated a business simulation game in a four-stage experiment in order to test incentive-based nature protection policies to reduce biodiversity losses.

Simulation games can serve the experimental design in a broad range of economic research. To the best of our knowledge, an experiment with a grain marketing game hasn't been conducted yet. As a result, MINE represents an excellent opportunity to investigate the behavior of producers towards risk in grain marketing. Its software flexibility allows the researcher to design experiments as simple as possible and as complex as necessary in order to adjust the level of difficulty to the level of the subject pool. Decision-training games as MINE, could be a tool in researching human behavior and interactions (Borawski, 2016).

Researchers at the University of Nebraska-Lincoln have modified MINE to conduct research on identifying important factors influencing grain marketing strategies. The research objective is twofold. The first segment tests whether risk preferences have an impact on grain marketing decision making; that is, if producers with different perceptions towards risk, market their grain in different ways. Even though there are many studies in risk preferences, this question is very case-specific because it focuses only on grain marketing. Thus, it may be necessary to have a case-specific mechanism for the elicitation of individuals' risk preferences as well. Therefore, the second segment of this research project is to incorporate MINE into the experimental design in order to test its efficiency as an experimental tool. By changing one MINE parameter each time, the experimenter creates various treatments. Change in participants' responses to these changes, reveals their risk preferences.

Another issue of great interest is grain marketing behavior in response to price fluctuations over time. The first conjecture is that individuals with different risk preferences respond in a different way under the same price fluctuations. The second conjecture is that individuals' responses are dynamically adapted as price fluctuations change. More specifically, it is expected that individuals will sell their grain earlier if prices tend to decline over time than if prices tend to increase over time. In order to study this issue, dur-

ing the experiment participants make marketing decisions several times in response to prices from a different year. Apart from prices, the study also controls for the impact of several socio-demographic variables; that is, if gender, age, educational background, experience in grain production etc. play an important role on the grain marketing practices.

Further research could also be conducted in measuring the impact of social environment on grain marketing decision making. The fact that a group of people can play MINE simultaneously, makes it a potential means through which social interactions could be captured and their influence on grain marketing could be captured. To conclude, MINE is an educational tool that helps producers to gain insights into grain marketing principles. Additionally, it fits perfectly into computer-based experimental designs, providing the opportunity for obtaining insightful results for experimental economics and grain marketing.

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