Teaching, Extension, and Research Applications of a Market Simulator

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Fed Cattle Market Simulator
Developers

- Four Agricultural Economists, each with unique background and experience
- James Trapp and Clement Ward, Professors
- Derrell Peel and Stephen Koontz, new Assistant Professors
  all at Oklahoma State University

Fed Cattle Market Simulator Structure

Overview of the Market Simulator

- Eight feedlot teams of 2-4 people market fed cattle
- Four meatpacking teams of 2-4 people purchase fed cattle
- Cattle supplies are exogenously controlled and cycle from larger to smaller to larger supplies
- Cattle can be marketed/purchased any time during a five-week market window at weights ranging from 1100-1200 lbs.
Overview of the Market Simulator continued

- Feedlots are penalized for feeding to excessive weights but packers have an incentive to purchase heavier cattle
- Each packer has a different cost structure and minimum cost volume
- Feedlot and packer teams negotiate sale/purchase prices in seven-minute trading weeks
- Teams can trade futures market contracts (one nearby and two distant contracts) and forward contract cattle

Profits to Share

Losses to Share

Average Total Cost by Plant Size
Overview of the Market Simulator
continued

- The beef demand function is based on a nine-week polynomial lag model estimated with weekly beef industry data.
- Market News reports within-week trading activity (volume, contracts, high and low prices) and end-of-week market summaries (volume, prices by weights, boxed beef price, cost of gain, feeder cattle purchase price).
- Cattle on Feed reports are presented monthly.

Overview of the Market Simulator
continued

- Teams receive weekly profit/loss statements.
- Ego awards, “Best team trophy” and “Best supporting team ‘gold and silver cow chips on a shingle’ trophy” are given monthly.
- Each workshop ends with a “lessons learned” debriefing period and an evaluation form.

Chronology of the FCMS

- Began development, summer 1990.
- Offered first classroom course, fall 1990.
- Received first and most important grant, USDA Higher Education Challenge Grant, 1991.
- Conducted the first industry workshop, Excel Corporation, 1992.

Chronology of the FCMS
continued

- Received a Chicago Mercantile Exchange Grant, 1993.
- Received first research grant from the Research Institute on Livestock Pricing, for a formal experiment, 1995.
- Published first research journal article, 1996.
Use in Classroom Teaching

- Offer a one credit, Special Problems Course
  Students are mostly juniors from agricultural economics and animal science
  Meet for 90 minutes once/week for a semester
- Include as a supplemental lab for Agricultural Price Analysis
  Meet once or twice a semester in four-hour sessions

Several Economic Concepts Are “Brought to Life” or “Made Real”

- Market and firm supply, demand
- Price determination, price discovery
- Market dynamics
- Marketing strategies
- Breakeven analysis
- Negotiation, communication skills
- Business ethics

Experiential Learning Model of the Fed Cattle Market Simulator

Managerial Skills Learned: Simulation vs. Lectures
Use in Extension Education

- Have conducted 80+, half-day to two-day workshops
- 34 with agricultural producers, including 6 National Cattlemen’s Beef Association conventions
- 17 with agribusiness managers, including 11 with Excel Corporation
- 15 with students and youth
- 14 with educators, including extension agent training in 7 states

Fed Cattle Market Simulator Workshops, 1991-1999

Agribusiness Cross-Training Model

- Corporate and Plant Operations
- Livestock Procurement
- Meat and Byproduct Sales

Participants’ Increased Knowledge of the Industry

- 1=Not very helpful
- 7=Very helpful

Number of Respondents
Participants’ Increased Understanding of Their Company

Participants’ Better Understanding and Appreciation for Other Positions in the Company

Adopting Universities
- Kansas State University - classroom teaching and extension
- Iowa State University - classroom teaching and extension
- Texas A&M University - extension
- University of Kentucky - extension
- Texas Christian University - classroom teaching
- Colorado State University - extension
- South Dakota State University - classroom teaching

Peer-Reviewed Publications
- Teaching
  - Journal of the National Association of College Teachers of Agriculture
  - Review of Agricultural Economics
- Extension
  - Journal of Extension
  - Agribusiness
- Research
  - American Journal of Agricultural Economics
  - Journal of Agricultural and Resource Economics
  - Review of Agricultural Economics
Experimental Simulation Research

- Price discovery for fed cattle: Validate economic relationships in the FCMS compared with similar econometric models using real-world data.
- Marketing agreement impacts: Analyze market effects from imposing an exclusive trading agreement between the largest packer and largest two feedlots.
- Value of publicly reported information: Analyze price impacts from full-information and three alternative limited information periods.

Experimental Simulation Research continued

- Value of vertical coordination: Compare an “optimal” marketing/purchasing strategy with alternative strategies.
- Meatpacking firm mergers: Analyze price and market power impacts from two mergers (two smallest packers, two largest packers).
- Buyer/seller bargaining power: Estimate bargaining power over fed cattle weights and alternative supply conditions.

Packer Market Shares by Period: Agribusiness A

Profit Rates by Period with Agribusiness A
Packer Market Shares by Period: Agribusiness B

Profit Rates by Period with Agribusiness B

Bargaining Power Relationship: Supplies and Weight

Awards Received
- Teaching
  Southern Agricultural Economics Association
- Extension
  Western Agricultural Economics Association
  Oklahoma Cooperative Extension Service
Concluding Remarks

- Oklahoma State University’s *Fed Cattle Market Simulator* has proven to have applications in all three missions of the Land Grant University system - teaching, extension, and research.