

Syllabus

Advanced Topics in Production

Part 1: Risk Management

Instructor: Dana L. Hoag
Office Hours: By appointment

Meeting time: Monday, 2:00-3:40 (Ends October 8, at 2:45)
Location: Animal Science 131

Purpose: This course covers the theory and practice of risk management in economics with a focus on learning how to model and manage risk in Excel. The course is appropriate for Ph.D. students studying economic topics including production, business, finance, resources, environmental or labor.

The class covers strategic risk management techniques, foundational underpinnings from expected utility, how to measure risk preferences, how to use @RISK to portray risks, and how to use Decision Tree and other economic tools to manage risk with and without including risk preferences.

Readings: *(All readings are provided in Canvas)*
 Risk Analysis in Theory and Practice, by Jean-Paul Chavas. 2004
 Applied Risk Management in Agriculture, by Dana Hoag, 2009
 Coping with Risk in Agriculture: Applied Decision Analysis by Hardaker, Lien,

Software: @risk and Precision Tree
 Please download and install your 1-year student version of decision Tools Suite, and familiarize yourself with @RISK and Decision Tree by going to the website:

Product: The DecisionTools Suite 7.5.x - Industrial (Student)
License Expiration: 365 Days after Activation
Download Link: <http://download.palisade.com/D6/752/DTSuite752-Setup.exe>
Activation ID: DNE-7105038-762B70-556

Grading: Homeworks = 80%
 Participation = 20%

Course Outline

Week 1: Introduction to risk management (JPC- p. 5-11; Hoag- chp 2 and 4)

- 1) What is risk and uncertainty
- 2) Risk Payoff Matrix exercise
- 3) Strategic Risk Management: Risk Navigator (Hoag-chp 4)
 - a. Sources of risk (Hoag-chp 8)
 - b. Controls for risk (Hoag-chp 9)
 - c. Measuring risk (Hoag-chp 10) (CWR chp 3)

- d. Putting it together in a Payoff Matrix (Hoag-chp 11)
 - e. Ranking
- 4) Risk in Production Economics (Zilberman lecture 12)

Homework: We will be using @Risk and Precision Tree to practice some applied examples. Please load the program and make sure it works on your computer. View the introductory videos before the fourth week, when we will begin to use the program (e.g. Guided tours-tutorial for @RISK and Decision Tree)

You may want to read a portion of the user manuals for @RISK and Decision Tree as well in order to better understand how to use these programs. Don't try to read the entire manuals. Just read the parts that help enable you to open and use the programs.

Also Read "Modeling with @RISK: A Tutorial Guide" by that same deadline.

Week 2: Expected Utility framework (JPC-chp 3; Hoag Chp 6; optional: Just and Pope, chp 1)

- 1) Maximizing expected value v.s. expected utility
- 2) Graphical representation of utility combined with risk
- 3) Functional forms of utility functions
- 4) Taylor series expansion to show $EU = f(\pi, \sigma_\pi)$
- 5) Validity of EU (Zilberman lecture 14)

Homework: Compute your own risk preference score. Fill in the EU exercise for risk in raisons.

Week 3: Risk preferences (JPC-chp 4; Hoag -chp 6)

- 1) Measures of risk aversion (Zilberman lecture 9)
- 2) Elicitation (Hoag, p. 100-103)

Homework: Complete EU Excel exercise

Week 4: Measuring and modelling risk (Hoag-chp 8) (jpc pg 9-18)(Coping w/ risk cpt 3)(@risk and precision tree user manuals)

- 1) Prioritizing risk (Hoag)
- 2) Probability (Coping with risk; jpc)
- 3) Using @risk
 - a. Loading and using
 - b. Tutorial example
- 4) Using Decision Tree
 - a. Loading and using
- 5) Modeling examples in @RISK and Decision Tree

Homework: To be determined (TBD)

Week 5-6: Managing risk with unknown preferences (JPC-chp 5; CWR chp 7)

- 1) MV frontier and utility preference mapping (JPC-chp 6)(Zilberman Lecture 13)
- 2) Stochastic dominance
 - a. First degree and second degree
 - b. SD with respect to a function and S Efficiency RF (JPC-chp 5)
- 3) MOTAD
- 4) SERF analysis

Homework: (TBD)

Week 7 (Managing risk with known preferences)

- 1) Making choices when including risk preferences
- 2) Problem solving examples
 - a. Production theory (JPC-chp 8) (raison example)
 - b. Price stabilization (JPC-chp 13)
- 3) Other models
 - a. Safety first

Homework: (TBD)