

AGRICULTURAL ECONOMICS 613

INTRODUCTION TO ECONOMICS OF RISK

Syllabus

3 credits, 3 hrs. of lecture:

Prerequisites: STAT 511, ECON 511, AGECE 552 (or equivalent statistics, microeconomics and math programming)

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Description and Objectives

The course is an introduction to the economics of risk. It emphasizes the expected utility hypothesis and individual decision making. The course is presented at a level that can be handled by agricultural economics master's students who have had intermediate microeconomic theory. It will be oriented toward providing a background in expected utility theory and application from which students can move on to applications and more advanced work in their fields of specialty.

Grading

Homework and class participation 50%
Final exam 50%

Term Paper

Ph.D. students are required to do an acceptable paper or presentation; a term paper or presentation is not required of master's students. The project or presentation is not intended to be a huge deal. I want you to do something outside of what is covered in class. Some examples: review several articles on a topic, do something empirical, or give a lecture to the class on something you are doing or have done in the area of risk. Many students in the past have presented their MS thesis work if it has something to do with risk, or present something they are working out for their dissertation if it has something to do with risk. I will be flexible and most students choose the presentation option, but a paper is equally acceptable.

Office Hours

Stop in or call for an appointment. Because of the window situation, I may not be in the office very much – we will see how the new office situation works out. The other class I teach (AGECE 424) has 97 students and meets MWF 1:30 to 2:20 and has two hour labs on Thursdays at 8:30

and 12:30 and on Friday at 8:30. I check email often (including early morning, evenings, and weekends).

COURSE OUTLINE

Class 1&2: Introduction: Expected Utility Hypothesis, Axioms, Proof of EUH, uniqueness of utility, EUH history

Readings: 1 (pp. 77-85) and 2

Classes 3 through 7: Technical Aspects of Risk: indirect utility; risk aversion; certainty equivalent; risk premium; insurance premium; maximum bid; absolute and relative risk aversion; increasing, constant, and decreasing absolute and relative risk aversion; units of risk aversion; bounded utility; uncertain vs. certain initial wealth; investor behavior and risk aversion; utility of wealth vs. income; log utility and geometric mean; utility functional forms; getting $U(W)$ from $r(W)$.

Readings: 1, 3-6, 11

Class 8: Utility elicitation, Joint estimation of technology and risk preferences

Reading: 12, 13

Class 9 and 10: Review of probability and Expected utility and moments

Reading: 15

Class 11 & 12: Stochastic Dominance

Readings: 22, 23, 26

Class 13 & 14: Mean-Variance Model

Readings: 29, 30

Class 15: Riskless Assets: MV Separation Theorem, (SD with a riskless assets)

Readings: 16, 19-23

Class 16 & 17: Covariance Risk, Diversification, Single Index Model

Readings: 32, 35

Class 18: MOTAD, Target MOTAD

Readings: 37, 38

Class 19: CAPM

Readings: 43, 44

Class 20: Increasing Risk

Readings: 46

Class 21: Lexicographic Utility and Safety First

Class 22: GAMS problems

Class 23 & 24: Production under Risk

Readings: 53

Class 25: Increasing Risk II

Reading: 54

Class 26: Time, Risk, and Related Issues

Reading: 55

Class 27 & 28: Discrete Stochastic Programming

Readings: 58

Class 29: Anomalies and Prospect Theory

Readings: 64-66

Class 29: State Preference Theory

Readings: 67, 68

Class 30: Review of EUH

Readings: 69, 70 (tentative)

AGEC 613 Readings

Note: The articles in **bold** are in a 'packet' that you can borrow from my secretary and are a high priority for your reading time. The numbers are supposed to correspond to the number on the file in the AGECE 613 Readings file cabinet (in Krannert 619). Most of the journal articles are available on-line.

Introduction

1. **Copeland and Weston, Financial Theory and Corporate Policy, Chapter 4, pp. 77-108.**
2. Luce and Raiffa, Games and Decisions, Chapter 2, pp. 12-38.

Technical Aspects of Risk

3. **Levy and Sarnat, Portfolio and Investment Selection: Theory and Practice, Chapters 4 and 5.**
4. **Robison and Barry, The Competitive Firm's Response to Risk, Chapters 1, 2, and 3.**
5. **Pratt, "Risk Aversion in the Small and in the Large", Econometrica, Vol. 32, No. 12 (January-April 1964), pp. 122-136.**
6. **Arrow, "The Theory of Risk Aversion," Ch. 3 in Essays in the Theory of Risk Bearing.**
7. **Raskin and Cochran, " Interpretations and Transformations of Scale for the Pratt-Arrow Absolute Risk Aversion Coefficient: Implications for Generalized Stochastic Dominance," Western Journal of Agricultural Economics, 11(2): 204-210**
8. **Mossin, Jan, "Optimal Multiperiod Portfolio Policies" J. of Business, April 1968, pp. 215-229.**
9. **Keeney & Raiffa. Decisions with Multiple Objectives: Preference and Value Trade Offs, Chapter 4.**
10. **Ingersoll Theory of Financial Decision Making, Rowman and Littlefield, 1987**
11. **Saha, Atanu. "Expo-Power Utility: A 'Flexible' Form for Absolute and Relative Risk Aversion," Am. J. Agr. Econ. November 1993, pp. 905-913**

Measuring Risk Attitudes

12. **Anderson, Dillon, and Hardaker, Ag Decision Analysis, Chapter 4.**

13. Saha, Atanu, C. Richard Shumway and Hovav Talpaz, "Joint Estimation of Risk Structure and Technology Using Expo-Power Utility: Am. J. Agr. Econ., 76(May 1994):173-84.
14. Cochran, M. J., P. Zimmer, S. C. Goh, N. D. Stone, T. Toman, and G. L. Helms. "An Expert System to Elicit Risk Preferences: The Futility of Utility Revisited?" Computers and Electronics in Agriculture. 4(1990):361-375.

Numerous other references on this topic will be handed out in class.

Review of Probability

15. Anderson, Dillon, and Hardaker, Ag Decision Analysis, Chapter 1 and 2.
16. Taylor, C.R., "Two Practical Procedures of Estimating Multivariate NonNormal Errors," Am. J. Agr. Econ. 72(Feb 1990): 210-17.
17. Moss and Shonkwiler, "Estimating Yield Distributions with a Stochastic Trend and Nonnormal Errors," Am. J. Agr. Econ. 75(Nov. 1993)1056-62.
18. Ramirez, Moss, and Boggess, "Estimation and Use of the Inverse Hyperbolic Sine Transformation to model Non-Normal Correlated Random Variates," J. Appl. Stat. 21(Dec 1994): 289-304.
19. Ramirez "Estimation and Use of a Multivariate Parametric Model for Simulating Heteroskedastic, Correlated, Nonnormal Random Variables: The Case of Corn Belt Corn, Soybeans, and Wheat Yields," Am. J. Agr. Econ. 79(Feb 1997):191-205.
20. Paul W. Gallagher, U. S. Corn Yield Capacity and Probability: Estimation and Forecasting with Non-symmetric Disturbances *North Central Journal of Agricultural Economics* , Vol. 8, 1, pp. 27, January, 1986 (paper on negatively skewed corn yields)
21. Paul W. Gallagher, U.S. Soybean Yields: Estimation and Forecasting with Non-symmetric Disturbances *American Journal of Agricultural Economics* , Vol. 69, 4, pp. 796-803, November, 1987 (paper on negatively skewed soybean yields)
22. Just, Richard E. and Quinn Weniger. "Are Crop Yields Normally Distributed?" Am. J. Agr. Econ. 81(May 1999):287-304.

Stochastic Dominance

Basic Stochastic Dominance

23. Hanoch and Levy, "The Efficiency Analysis of Choices Involving Risk", Rev. of Econ. Studies, pp. 335-346.

24. **Levy and Sarnat, Portfolio and Investment Selection, Chapter 6, “The Efficiency Analysis of Investment Under Uncertainty: Stochastic Dominance Rules”.**

Nth Order Stochastic dominance

25. Ingersoll, Theory of Financial Decision Making, Appendix to Chapter 5, “Stochastic Dominance”.

Stochastic Dominance with Respect to a Function

26. Meyer, J. “Choice Among Distributions”, Journal of Economic Theory 14(1977):326-336.

27. **Meyer, J. “Second Degree Stochastic Dominance With Respect to a Function”, International Economic Review, 18(1977):477-487.**

28. King and Robison, “An Interval Approach to Measuring Decision Maker Preferences”, Am. J. Agr. Econ., 63(1981):510-20.

29. Goh, Shih, Cochran, Raskin, “A Generalized Stochastic Dominance Program for the IBM PC”, Southern Journal of Agricultural Economics, December 1989, pp. 175-182.

Mean-Variance

30. **Turvey, Baker, Weersink, “Farm Operating Risk and Cash Rent Determination”, Journal of Agricultural and Resource Economics, 1992.**

31. **Levy and Sarnat, Portfolio and Investment Selection: Theory and Practice, Chapters 7, 8, 9.**

32. Levy and Sarnat, Capital Investment and Financial Decision, Chapter 11, “Decreasing Risk by Diversification: The Portfolio Approach”.

MV with a Riskless Asset (Separation Theorem)

33. **Johnson, S.R. “A Re-examination of the Farm Diversification Problem”, J. of Farm Economics, 49(1967) :610-621.**

34. Tobin, J. “Liquidity Preference as Behavior Towards Risk”, Rev. of Econ. Studies, (Feb. 1958), pp. 65-86.

SD with a Riskless Asset

35. Levy and Kroll, “Ordering Uncertain Options With Borrowing and lending”, J. of Finance, May 1978, pp. 553-574.

36. Levy and Kroll, "Efficiency Analysis With Borrowing and Lending: Criteria and their Effectiveness", Review of Econ. and Statistics, Feb. 1979, pp. 179-205.
37. Levy and Kroll, "Stochastic Dominance With a Riskless Asset: An Imperfect Market", J. of Financial and Quantitative Analysis, June 1979, pp. 179-205.

MOTAD

38. Hazell, P.R.B. "A Linear Alternative to Quadratic and Semivariance Programming for Farm Planning Under Uncertainty", Am. J. Agr. Econ., Feb. 1971, pp. 53-61.
39. P. Barry, editor, Risk Management in Agriculture, Chapters 9 and 10.
40. Tauer, L.W. "Targt MOTAD", Am. J. Agr. Econ. 15(1983):606-610.

Single Index Model

41. Sharpe, William F. "A Simplified Model for Portfolio Analysis" Management Science Jan. 1963, pp. 277-293.
42. Collins and Barry, "Risk Analysis With Single-Index Portfolio Models: An Application to Farm Planning", Am. J. Agr. Econ., Feb. 1986, pp. 152-161.
43. Turvey, C.G., H.C. Driver, and T.G. Baker, "Systematic and Nonsystematic Risk in Farm Portfolio Selection", Am. J. Agr. Econ., Nov. 1988, pp. 831-836.

CAPM

44. Copeland and Weston, Financial Theory and Corporate Policy, Chapter 7, "Market Equilibrium: CAPM and APT".
45. Levy and Sarnat, Portfolio and Investment Selection: Theory and Practice, Chapter 11, "The Capital Asset Pricing Model (CAPM): Price Determination in the Stock Market".
46. Barry, P. J. "Capital Asset Pricing and Farm Real Estate" AJAE. 62(1980): 549-553

Increasing Risk

47. Rothschild and Stiglitz, "Increasing Risk: I. A Definition", Journal of Economic Theory, 1970, pp. 225-243.

Lexicographic Utility and Safety First

48. Barry, P.J., editor, Risk Management in Agriculture, Chapter 2 (pp. 19-21), and Chapter 5.

49. Robison and Barry, **The Competitive Firm's Response to Risk**: Chapter 14.
50. Kataoka, S. "A Stochastic Programming Model: **Econometrica** 31(1968):181-196.
51. Roy, A. D. "Safety-First and the Holding of Assets" **Econometrica** 20(1952):431-449.
52. Telser, L. "Safety-First and Hedging" **Review of Economic Studies** 23(1955-1956):1-16.
53. Charnes, A. and W.W. Cooper, "Chance Constrained Programming", **Management Science** 6(1959):73-79.

Production Under Risk

54. Anderson, Dillon and Hardaker, **Ag Decision Analysis**, Chapter 6, "Production Under Risk".
55. Rothschild and Stiglitz "Increasing Risk II: Its Economic Consequences, **J. Econ. Theory**, (1971), pp. 6684.

Time, Risk and Related Issues

56. Hertzler, Greg. (1997). A new theory for explaining the paradoxes in decision making under risk and for measuring time and risk preferences. In **Risk management strategies in agriculture; State of the art and future perspectives** edited by R. Huirne, J. Hardaker and A. Dijkhuizen 1997, Mansholt Studies 7, Backhuys Publishers, Leiden, 319 pp.
57. Ingersol, **Theory of Financial Decision Making**, pp 43-44, Chapter 10 "Intertemporal Models in Finance," and Appendix A to chapter 11.
58. Schnitkey and Novak. "Alternative Formulations of risk Preferences in Dynamic Investment Models," S-232 Proceedings 1994, Iowa State University.

Discrete Stochastic Programming

59. Featherstone, Preckel, and Baker, "Modeling Farm Financial Decisions in a Dynamic and Stochastic Environment", **Agr. Finance Rev.** 50(1990):80-99.
60. Cocks, "Discrete Stochastic Programming", **Management Science** 15(1968):72-79.
61. Rae, A.N. "An Empirical Application and Evaluation of Discrete Stochastic Programming in Farm Management", **Amer. J. Agr. Econ.** 53(1971):625-638.
62. Rae, "Stochastic Programming, Utility, and Sequential Decision Problems in Farm Management", **Am. J. Agr. Econ.** 53(1971):448-60.

63. Krause, Deuson, Baker, Preckel, Lowenberg-DeBoer, Reddy, and Maliki, "Risk sharing Versus Low-Cost Credit Systems for International Development", **Am. J. Agr. Econ.** Nov. 1990, pp. 911-922.
64. Turvey and Baker, "A Farm-Level Financial Analysis of Farmers' Use of Futures and Options Under Alternative Farm Programs", **Am. J. Agr. Econ.**, Nov. 1990, pp. 946-957.

Anomalies and Prospect Theory

65. Collins, W. Musser, and R. Mason, "Prospect Theory and Risk Preferences of Oregon Seed Producers", **Am. J. Agr. Econ.**, May 1991, pp. 429-35.
66. Kahneman, and Tversky, "Prospect Theory: An Analysis of Decision Under Risk", **Econometrica** 47(1979)263-91.
67. Machina, Mark, J., "Choice Under Uncertainty: Problems Solved and Unsolved," **Economic Perspectives**, volume 1, number 1, summer, 1987, pp. 121-154

State Preference Theory

68. Copeland and Weston, **Financial Theory and Corporate Policy**, Ch. 5, "State-Preference Theory", pp. 109-139.
69. Arrow, "The Role of Securities in the Optimal Allocation of Risk-Bearing", **Review of Economic Studies**, pp. 91-96

Review of EUH

70. Schoemaker, Paul, "The Expected Utility Model: Its Variants, Purposes, Evidence and Limitations", **J. Econ. Lit.** June 1982, pp. 529-63
71. Anderson, Dillon, Hardaker, "Farmers and Risk", Invited paper at the XIX International Conference of Agricultural Economists, Aug. 26-Sept. 4, 1985, Malaga, Spain, pp. 1-10.