



Ph.D. in ECONOMICS – Universities of Milan and Pavia

Games, Uncertainty, and Information

Academic year 2016-17 – Fall Term

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Course description

The course is about microeconomic fundamentals of individual choice under risk, under strategic interactions with other individuals, and under asymmetric information, taken as separate issues and as combined issues as well. The applications of the theory, that however shall not be the object of the course, range from labor to credit markets, from insurance to macroeconomics, from market regulation to policy design. When possible, examples from these fields shall be provided. The first module is about decisions under risk and about fundamentals of non-cooperative game theory. The second module deals with special topics in game theory and asymmetric information, agency problems, adverse selection.

Course objectives

The course will offer an introduction to the topics and the basic tools of analysis, providing the ability to reason in a rigorous way about market interactions with asymmetric information and strategic behaviour. The student shall get to appreciate the pervasiveness of the issues analysed and find motivation for his/her research.

Course prerequisites

A good microeconomic background, and a basic calculus course.

Course organization: There are 16 lectures (36 hours) to be held in Via Pace, Aula B.

Course Assessment: The assessment is based on a written exam.



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COURSE OUTLINE

1. **Risk and Uncertainty.** Simple and compound lotteries. Axioms of preference under uncertainty. The Expected Utility Model.
2. **Applications.** Risk Aversion. Measures of risk aversion. Some classical utility functions. Insurance decisions. Portfolio choice and background risk..
3. **Strategic interaction.** Common knowledge and individual rationality. Game forms. Notion of strategies (pure and mixed). Equilibrium concepts.
4. **Applications:** Oligopoly theory. Cournot games. Entry deterrence and war of attrition. Tacit collusion.
5. **Games and information.** Game tree and information structure. Sequential rationality. Solution of extensive form games. Bayesian Equilibria.
6. **Topics in games of incomplete information.** Multiplicity of equilibria and Refinements of equilibria.
7. **Adverse selection.** Adverse selection in markets and its consequences. Signaling games. Applications to the labor market. Application to the insurance market.
8. **Moral hazard and incentives.** Contracts and risk sharing. Hidden action vs. hidden information models. Principal-Agent relationship. Applications to credit rationing.
9. **Mechanism design basics.** Introduction to the concept of mechanism. Efficient and second best solutions. Impossibility theorems. Applications.

References

Mas-Colell A., Whinston M.D., Green J.R. , *Microeconomic Theory*. Oxford University Press, chapters 6, 7, 8, 9, and 12

Fudenberg D. and Tirole J., *Game Theory*, Chapter 7

Tirole J.: *The Theory of Industrial Organization*, Chapter 5.

-Tadelis S., *Game Theory: An Introduction*, Princeton University Press, 2013

-Jackson M.O. , *Mechanism Theory*, mimeo, available online. Also in *Optimization and Operations Research*, edited by Ulrich Derigs, in the *Encyclopedia of Life Support Systems*, EOLSS Publishers: Oxford UK, [<http://www.eolss.net>], 2003.

-Eeckhoudt L., Gollier C. and Schlesinger H., *Economic and Financial Decisions under Risk*, Princeton University Press, 2005. Chapters 1,2,3,4.

-Van Zandt, T. *Introduction to the Theory of Uncertainty and Information*, available online.

