

**Political Science**

Academic year 2009 - 2010

**Game Theory and Rational Choice Approaches to Politics and Political Economy****E792 - Autumn – 6 ECTS**  
**Mondays 16:15-18:00 (Rigot 2)****> PROFESSOR**Urs Luterbacher  
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(Rigot 38)**Syllabus**

Game theoretical and Rational Choice approaches, ideas, and concepts have been applied to several critical issues in domestic and international relations. Rational choice approaches have had some success: They have mostly helped in solving some standard theoretical puzzles. A standard puzzle in rational choice and game theory resides in the difficulty to provide an analytically coherent explanation for apparently irrational decisions that involve high costs and uncertain benefits for those who take them. Among such decisions, one can evoke the choice to resist the competition of a strong new entrant such as a big chain store by a local outfit or the resolve shown by a weaker country to refuse demands from a major military power and to fight. Conflicts and warfare with their high costs and dubious rewards are particularly difficult to rationalize even though they seem to continue to occur. From a rational choice standpoint fighting involves taking short-term losses but may help creating a reputation that will keep opponents away in the future. Another standard puzzle is connected to cooperation: How and why is cooperation achieved? The famous Prisoner's Dilemma and Commons problems illustrate these questions. Prisoner's Dilemma illustrates the problem of achieving collectively better outcomes because everybody has an individual incentive to defect. Commons are the relevant metaphor for resources to which everybody has free access and thus an incentive to use as much of them as possible without regard to what the other users are doing. If every user has the same attitude, the resources are rapidly depleted and the environment to which it belongs is no longer sustainable. Obviously, these failures in cooperation are linked to the causes of conflict and warfare. Overuse of natural resources creates scarcities. This leads individuals or households who experience them to try to appropriate more resources for themselves by, among other things, producing more children. The result is a population increase that aggravates scarcities even more. The absence of regulations and predetermined dispute resolution schemes, along with the scarcities, lead to incentives to appropriate resources by force. Armed conflicts ensue among rival bands whose leaders try to take advantage of the situation for themselves. Several incentive structures generate conflict and cooperation problems which can be analyzed with the help of Game Theory and rational choice approaches. Game theoretical ideas and concepts have been applied to several critical issues:

1. Determining the incentives of various relevant actors (states, corporations, and individuals) concerned by Prisoner's Dilemma and Commons situations under different conditions.
2. Solving conflicts generated by Prisoner's Dilemma and Commons issues in which often actors see each other as preying on exhaustible or slowly renewable resources. How can such conflicts be solved?
3. Elaborating policies that would appear to be optimal to avoid the problems raised by Prisoner's Dilemma and Commons.
4. Negotiating the regulation of the international environment. In these complex negotiations among international actors, governments are often caught between international and domestic pressures on these issues. The metaphor of two level games has been introduced by Putnam to analyze political situations characterized by such cross-pressures.

This seminar intends to give students a survey of game theoretical concepts, ideas, and methodologies and of the ways these can be applied to the issues of coping with Prisoner's Dilemma and Commons problems, environmental and trade bargaining negotiations, and agreements at the international level.

#### Requirements

2 Game Theoretical exercises and 1 essay applying game theory to a concrete problem: environment, trade, conflict in general.

#### Course organization and work schedule

Most readings on the following list are required. The excellent book by Martin Osborne called *An Introduction to Game Theory* presents a readable review of game theoretic concepts and ideas presented in simple ways that most anybody familiar with a bit of algebra can master. I will use it as a textbook to accompany the course.

#### Sept. 21: General Introduction to Course: Substance, Organization, Requirements

#### Sept. 28: Substantive Introduction: Puzzles and difficulties in Decision Making and Cooperation

Hardin, Garret, (1968) The Tragedy of the Commons, *Science*, 162:1243-48.

Dasgupta, P.S. and G. M. Heal (1979) Economic Theory and Exhaustible Resources. The Cambridge economic Handbooks, Cambridge: Cambridge University Press. Chapters 1, 2 (pages 11-21 especially discussion about different equilibrium concepts)

#### Oct. 5: The Problem of the Commons and Conflict

Dasgupta, P.S. and G. M. Heal (1979) Economic Theory and Exhaustible Resources. The Cambridge economic Handbooks, Cambridge: Cambridge University Press. Chapt. 3.

Luterbacher, Urs, Ellen Wiegandt and Dominic Rohner *Unfolding Tragedies: Explaining and Predicting Future Environmental Scarcities and Conflicts*, Ms. Graduate Institute of International and Development Studies, 2008: 1-4.

**Oct. 12: Representing actors incentives:**

Osborne, Martin J. (2004) *An Introduction to Game Theory* New York, Oxford: Oxford University Press: Chapt. 1 (Introduction).

**Oct. 19: Rational Choice and Decision Theory under Uncertainty: History and Methodology**

Bernstein, Peter (1998) *Against the Gods* Introduction, Chapt. 6 and Chapt. 7

Fishburn, Peter (1990) *Utility Theory and Decision Theory*. In John Eatwell, Murray Milgate, and Peter Newman, *Utility and Probability*, The New Palgrave, New York: W.W. Norton and Co. pp. 303-312.

**Oct. 26 Perfect Information: Equilibrium Notions**

Osborne, Martin J. (2004) *An Introduction to Game Theory* New York, Oxford: Oxford University Press: Chapt. 2 plus glance at Mathematical Appendix, Chapt. 3: 3.1, 3.3, 3.4

**Nov. 2 Mixed Strategies and Extensive Games**

Osborne, Martin J. (2004) *An Introduction to Game Theory* New York, Oxford: Oxford University Press: Chapt. 4, 5, 6 : 6.1, 6.3. Chapt. 7: 7.3, 7.4.

**Nov. 9 Imperfect Information and Evolution**

Osborne, Martin J. (2004) *An Introduction to Game Theory* New York, Oxford: Oxford University Press: Chapt. 9: 9.1-9.5. Chapt. 10: 10.1-10.5, 10.8, 10.9, Chapt. 13: 13.1, 13.2.

**Nov. 16 Bargaining**

Osborne, Martin J. (2004) *An Introduction to Game Theory* New York, Oxford: Oxford University Press: Chapt. 16

Fearon James (1995) "Rationalist Explanation for War" *International Organization*, 49, 3: 379-414.

Dasgupta, P.S. and G. M. Heal (1979) *Economic Theory and Exhaustible Resources*. The Cambridge economic Handbooks, Cambridge: Cambridge University Press: 397-400.

**Nov. 23 Multilateral Questions, Coalitional Games and the Core**

Osborne, Martin J. (2004) *An Introduction to Game Theory* New York, Oxford: Oxford University Press: Chapt. 8: 8.1, 8.2, 8.3, 8.6, 8.8.

Luterbacher, Urs (1994) *International Cooperation: The Problem of the Commons and the Special Case of the Antarctic Region*, *Synthese* 100: 413-440.

**Eyckmans Jon and Henry Tulkens (2003) Simulating coalitionally stable burden sharing agreements for the climate change problem Resource and Energy Economics, In press.**

**Greif, Avner (1993) Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition, The American Economic Review, 83, 3, 525-548.**

**Barrett, Scott (1998) A Theory of International Co-operation, Working Paper, Johns Hopkins University School of Advanced International Studies.**

#### **Nov. 30 The Environment, Trade and Cooperation: Two Level Problems**

**Putnam R.D. (1988) Diplomacy and Domestic Politics: The Logic of Two Level Games. International Organization 42: 429-460.**

**Pahre, R. and A Papayoannou (1997) Using Game Theory to Link domestic and International Politics Journal of Conflict Resolution. 41, 1: 4-11.**

**Mansfield, Edward D., Milner Helen V. and Peter Rosendorff "Free to Trade: Democracies, Autocracies and International Trade" American Political Science Review, June 2000.**

#### **Dec. 7 Game theory and Externalities**

**Bergstrom, Theodore (2002) Lecture 4- Lindahl Equilibrium, Ms. University of California Santa Barbara.**

**Chichilnisky, Graciela "Knowledge and the Environment: Markets with Privately Produced Public Goods" in Chichilnisky Graciela, Geoffrey Heal and David Starrett edits Environmental Markets, Equity and Efficiency, New York: Columbia University Press: 242 -246.**

**Luterbacher, Urs, Ellen Wiegandt and Dominic Rohner Unfolding Tragedies: Explaining and Predicting Future Environmental Scarcities and Conflicts, Ms. Graduate Institute of International and Development Studies, 2008: 4-35**

#### **Application to Concrete situations I**

#### **Dec. 14: Application to Concrete situations II**