Analysis of International Relations  
Political Science 376

International politics is about strategic interaction among actors, especially states, in the world arena. When governments make choices about the size of their military forces, whether to reduce barriers to trade, or whether to comply with international agreements on environmental issues, they take into account the likely responses and actions of others. This course introduces the logic of strategic interaction in international politics by way of simple game theory. The principles of game theory are introduced, and you will learn how to solve simple games. Mathematical topics covered include probabilities, set theory, summation notation and infinite series, and linear equations. The games are motivated and illustrated with examples drawn from international politics. The logic of strategic interaction and techniques of game theory developed in this class have wide applications outside the field of international relations.

When we study international relations, we take into account the incentives for states to anticipate the likely actions and responses of other states. States cannot gain their objectives in the international arena if they behave naively, ignoring the potential for others to react to their actions. As Thomas Schelling put it, international politics is a realm of “interdependent decision.” States strategize. Analysts study this strategic interaction using both informal and mathematical methods. One mathematical approach to strategic interaction is called game theory, and basic game theory includes the use of algebra, set theory, and probability theory.

The strategic analysis of international politics has deep historical roots. It began with studies of deterrence and bargaining. Over time, studies of these issues have become more mathematical in their approach. They have also been supplemented by studies of other types of international interaction, such as trade, cooperation, and environmental issues. Today, the use of game theory is standard in the analysis of international relations. The type of game theory used ranges from very simple to highly sophisticated.

The study of international strategic interaction thus provides an ideal framework for introducing the basics of game theory. From the perspective of quantitative reasoning, perhaps the most important set of lessons will be the logic of strategic interaction and the notion of an equilibrium. Introducing basic game theory also allows you to use the following mathematical tools: algebra, set theory, functions, and probability theory.
Structure of the course

The major textbook for this course is *Games of Strategy*, 4th ed. (Dixit, Skeath, and Reiley). The organization of the course generally follows that of Dixit, Skeath, and Reiley. We will begin by introducing the basic elements of game theory. We then move on to two different ways to present games, the extensive form and the strategic (or normal) form. We follow with some special topics, then turn to the notion of repeated games. We then move on to consider how incomplete information can be integrated into game theory, and finish with some applications and extensions.

Assigned readings follow. Most weeks include readings from Dixit, Skeath, and Reiley and a supplemental reading that relates these techniques to the study of international relations.

Discussion sections will meet once a week. It is very important that you complete the assigned reading before lectures and come prepared to discuss it in depth in sections. Sections will also be used to discuss problem sets. You will have eight problem sets due over the course of the semester, as indicated in the reading list. Problem sets are due in lecture on the date indicated. There are three in-class midterms.

Grading

Grades will be calculated using the following formula:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Problem sets</td>
<td>25%</td>
</tr>
<tr>
<td>Exams</td>
<td>75% (25% each)</td>
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</tbody>
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Please note: The material in this course is cumulative. That is, each week builds on the material covered in previous weeks. That means that the work, particularly the math, gets more difficult over the course of the semester. Please be aware that students who are able to breeze through the first test often find that they need to work significantly harder on the second and third tests to achieve the same grade.

Discussion sections will be used to go over material from lecture, problem sets, and exams. Your TA will work through more examples of games and answer any questions you have about lectures or readings. You should make a point of attending section if you are having any difficulty with the material. Section participation will be taken into account if your grade based on exams and problem sets is near a cutoff (say, on the margin between B and AB).
Books


These books are available through the University Bookstore or online merchants, and I’ve requested that they be put on reserve. Additional supplemental readings will be posted on learn@uw.

TA information

Monica Widmann
Email: widmann@wisc.edu
Office Hours: Thursdays 9:00-11:00 at Aldo’s Cafe

Topics, readings, and schedule

January 19 Introduction

January 21 and 26 Overview of game theory
DSR chp. 1
Schelling, pp. 3-20

January 28 Elements of games
DSR chp. 2, pp. 17-27

February 2 Rationality
DSR chp. 2, pp. 27-41; chp. 7, pp. 263-67

February 4 Extensive form
DSR chp. 3, pp. 48-57

February 9 More on extensive form
DSR chp. 3, pp. 57-80

February 11 Strategic form; discrete strategies
DSR chp. 4, pp. 91-106
Schelling, pp. 83-118

February 16 Minmax and other pure strategy equilibria
DSR chp. 4, pp. 106-120

Problem set 1 due

Problem set 2 due
February 18  Mixed strategies  
DSR chp. 7, pp. 214-233  
Schelling, pp. 175-203  

Problem set 3 due

February 23  Review Session

February 25  Exam 1

March 1  More on mixed strategies  
DSR chp. 7, pp. 233-49  

March 3 and 8  Spatial models  
Bruce Bueno de Mesquita, Principles of International Politics, 4th ed. (2006), chp. 2  

Problem set 4 due March 8

March 10 and 15  Repeated games  
DSR chp. 10  

March 17  Structure-induced equilibria  
DSR chp. 9  

March 29  Review Session

March 31  Exam 2

April 5  Uncertainty  
DSR chp. 89, pp. 271-81

Problem set 6 due April 12

April 7 and 12  Bayes’ Theorem  
DSR chp. 8, pp. 338-41

April 14 and 19  Signaling  
DSR chp. 8, pp. 304-19  

Problem set 7 due April 19
April 21  Bargaining
         DSR chp. 17
         Schelling pp. 21-80

April 26  Application: The Cuban Missile Crisis       Problem set 8 due
         DSR chp. 14

April 28  Experiments; evolutionary game theory
         DSR chp. 12

May 3    Review Session

May 5    Exam 3