

Political Science 559: Applied Game Theory in the Social Sciences

Fall 2017

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Class Room: 97 Mary Gates Hall
Class Time: Monday 1:30-4:20pm
Office Hours: Tues 4:20-5:20pm, Thurs 1:20-2:20pm

COURSE OVERVIEW

This course will focus on applications of formal (game theoretic) models in social science research. The course is designed to achieve two broad goals. First, students will develop the skillset to understand and critically evaluate simple formal models in their own areas of interest. To this end, we will work through a selection of papers which employ flexible, workhorse models in the social sciences. Each week students are expected to work through assigned models taking care to understand specific modeling decisions and the logical derivation of results. Second, we will engage in a quarter-long discussion about the usefulness of formal models and how they may or may not be an asset in your own research. Students will participate in two workshops during the quarter where they design and solve a simple formal model of their own. These workshops provide an opportunity to practice presenting formal models, receive feedback on the evolution of your theory, and learn from one another's challenges and successes in the early-stages of theory development.

A note on prerequisites. While an introductory course on game theory (i.e., POL S 559: Game Theory) or some other exposure to formal modeling (i.e., IPCSR, undergraduate coursework, self-study, etc.) is certainly helpful for this course, it is not necessarily a requirement. We will open the course with a primer on game theory that introduces the language and central concepts necessary to get started — this may feel like a review for some and deluge of information for others. Your performance will be evaluated accordingly, though our focus will never be on solving highly technical models. I see formal models as an exceedingly helpful tool in my own research and want to make that tool available to students, regardless of whether they become consumers or producers of formal models in their own research. If you are interested in taking the course but concerned about your background and how that might affect your experience, please set up a time to come talk to me beforehand and I can provide you more information as you are deciding if it is a good fit.

ASSIGNED READINGS & ADDITIONAL REFERENCES

There is no textbook for this course and all required and non-required readings will be available on the course's **Canvas** page. While a tentative outline of the assigned readings is included below, I will as appropriate adjust these readings to better fit the substantive interests of the class. Any changes will be announced prior to the week of the assignment and the syllabus will be edited accordingly on Canvas.

A brief comment on the selection of the articles below. I have made an effort to include both some "greatest hits" and canonical models as well as a selection of simple models employed in recently published work, particularly those written by junior scholars only a few years removed from yourselves. A recurring discussion we will have in class is to evaluate the role and usefulness of models in different applications. In doing so, my goal is that students will leave the course with a better understanding of how formal models can be effectively employed in their own research and how to engage with a formal modeling literature, with or without a formal model of your own.

In addition to the readings included below, the following texts may be helpful as a reference for those of you interested in developing your own models. Each citation includes a link to the book's table of contents — feel free to come borrow mine and make copies of content you might find useful.

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

→ Tadelis (2013) is a good comprehensive game theory textbook that is popular for introductory game theory courses. If you are writing a model for the first time, it would be wise to review the treatment of that class of models in a text such as this.

Gehlbach, Scott. 2013. *Formal Models of Domestic Politics*. Cambridge: Cambridge University Press.

→ Gehlbach (2013) provides a series of great applications of fairly straightforward models of issues and institutions within a state such as electoral competition, delegation, coalition-building, and regime change (among others). The book is very accessibly written and is a fantastic source for both baseline models as well as brief summaries of how models in these areas have evolved.

Kydd, Andrew H. 2015. *International Relations Theory: The Game-Theoretic Approach*. Cambridge: Cambridge University Press.

→ Kydd (2015) is similar to Gehlbach (2013) in style and objectives, but is instead focused on models of inter-state interactions including bargaining, war, and multilateral cooperation. Again, the text provides clear explications of baseline models and traces their evolution in the extant literature.

Thomson, William. 2011. *A Guide for the Young Economist*. Cambridge: MIT Press.

→ Thomson (2011) has some helpful chapters on presentation of models for those of you writing and hoping to publish your first formal theory papers. He provides valuable tips on structure, formatting, clarity, and the like.

GRADES AND EVALUATION

Class Participation (25 percent of your course grade). This is not a lecture class and your attendance and active participation is necessary for your success in the course. I expect everyone to have read the required readings before class and, for those readings denoted below with a *, worked through the model *line by line* to the best of their ability. We will devote significant time to working through these models together on the board and I expect you to come with more familiarity than having given them a cursory read. For example, you should have notes on the motivation, model set-up, and notation and be comfortable presenting those sections to the class. If (and when) you get stuck working through results, make a note of why: what part doesn't follow for you? Is it a mathematical step or a logical step? Are there any natural extensions or different applications of the model? How would you need to change? I know this is hard and takes time, but it's the only way to get better and more comfortable with this literature.

Referee Report (10 percent of your course grade). Each student will submit a referee report on an assigned article as if they were reviewing an article for an academic journal. Your report should be no more than two pages double-spaced and describe the motivation, central question, and contribution of the paper. Additionally, you should provide and defend a critique of the article. Take particular care in explaining *why* you think something is done well or poorly. A chapter from Thomson (2001) on writing referee reports is posted on Canvas under "Additional References." Due at the start of class on Monday, November 13, 2017.

Workshop Presentations and Participation (25 percent of your course grade). We will hold workshops to discuss your projects in class on October 23 and November 27. Each student will be allotted 10-15 minutes

to present their project to the class followed by a group discussion focused on ideas for moving the project forward. General expectations for your presentations in each workshop are described in more detail below, but first and foremost you should view this as a time to get feedback from a group of smart people on your project. Perhaps somewhat different than what you are used to, I encourage you to direct attention to areas you are stuck, talk through false starts you may have had, highlight assumptions you are making that you find most troubling, etc. As you find it helpful, you are encouraged to use slides, handouts, and/or write on the board. Your project is not being evaluated on its merits until your final paper is submitted. Presentations and participation in the workshops are evaluated on your progress working through the early stages of theory-building and engagement with your classmates projects.

Final Paper (40 percent of your course grade). There are two options for your final paper for this class and I encourage you to pick whichever assignment better serves you at the current stage of your research and your broader research interests.

Option 1. The first option for your final paper is to develop and write-up a formal theoretical model of your own design. Your goal with this assignment is to define and solve the simplest model possible that addresses a specific question in your own research. The expectation is not that you submit a complete theory chapter of your dissertation, but that you have a “baseline model” identified and solved, paired with a thoughtful discussion of how moving forward you can either derive empirical implications of interest in your research or (productively) expand on the model.

Option 2. Alternatively, you can choose to write a review article of the formal modeling literature in your own area of interest. For example, if you are interested in legislative bargaining, you would trace the evolution of the formal modeling literature on legislative bargaining from the seminal contributions of Rubinstein (1982) and Baron and Ferejohn (1989) to more recent applications such as Câmara and Eguia’s (2017). To be clear, this is not a “book report” and you are expected to go beyond cataloging and summarizing the literature to engage and critique the modeling enterprise in your specific area of interest. To see examples of what this final product should look like, refer to the following articles:

- Gehlbach, Scott, Konstantin Sonin, and Milan W. Svolik. 2016. “Formal Models of Nondemocratic Politics.” *Annual Review of Political Science* 19: 565-584.
- Gilligan, Michael J. and Leslie Johns. 2012. “Formal Models of International Institutions.” *Annual Review of Political Science* 15: 221-243.

ACADEMIC DISHONESTY

Students at UW are governed by the **Student Conduct Code**, and academic dishonesty will not be tolerated. If I suspect that a student is in violation of the Student Conduct Code, I will refer the case to proper administrative authorities to determine further penalties. If a violation of the academic integrity policy is found to have occurred, the minimum penalty will be a zero (0) on the assignment/exam in question. If you have any questions about plagiarism and proper citation methods, please consult **Writing Center Tutorial on Plagiarism** or come speak to me.

STUDENTS WITH CHALLENGES

I want students to learn as much as possible and do well in this course. If you have already established accommodations with Disability Resources for Students (DRS), please communicate your approved accommodations to me within the first three weeks of class so we can discuss your needs in this course. If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations, you are welcome to contact DRS at 206-543-8924 or uwdrs@uw.edu.

APPROXIMATE FALL 2017 SCHEDULE

(● = required reading, ⊗ = reference text, ⊙ = assignment, ○ = non-required reading)

Introduction to Course and Game Theory Refresher

Monday, October 2, 2017.

We will open the first day with a review of the syllabus and course goals and expectations. I expect this to open a quarter-long conversation about how the course can best serve your research interests and productivity as it pertains to this class. In addition to the chapters from Shoemaker et al. (2003), the excerpts from Powell (1999) and Gailmard and Patty (2012) will guide our conversation about the role of formal modeling in social scientific research. Finally, we will begin a refresher (or introduction) to game theory concepts and language which will continue next week. If you prefer to review this in advance, the chapters from Tadelis (2013) are a good place to start.

- Shoemaker, Pamela J., James William Tankard, and Dominic Lasora. 2003. *How To Build Social Science Theories*. Thousand Oaks: Sage Publications, Inc. ⇒ pp. 107-166.
- Powell, Robert. 1999. "The Role of Formal Models." In *The Shadow of Power*. Princeton: Princeton University Press. ⇒ pp. 23-38.
- Gailmard, Sean and John Patty. 2012. "1.2 Theoretical Foundations and Methodological Considerations." In *Learning While Governing*. Cambridge: Cambridge University Press. ⇒ pp. 24-30.
- Clarke, Kevin A. and David M. Primo. 2007. "Modernizing Political Science: A Model-Based Approach." *Perspectives on Politics* 5: 741-753.
- ⊗ Tadelis, Steven. 2013. "Rational Decision Making." In *Game Theory: An Introduction*. Princeton: Princeton University Press. ⇒ pp. 3-11, 14-33.
- Gibbons, Robert. 1997. "An Introduction to Applicable Game Theory." *Journal of Economic Perspectives* 11: 127-149.
- Little, Andrew T. and Thomas B. Pepinsky. 2016. "Simple and Formal Models in Comparative Politics." *Chinese Political Science Review* 1: 425-447.
- ⊙ Assignment for 10/9/17: A quick google scholar search of "the political economy of" returns about 1,650,000 results (in a mere 0.05 seconds, no less). For class next week, identify a handful of publications (both canonical and recent) with formal models in your area of research interest.

Game Theory Refresher (Cont.) & How to Read a Formal Theory Paper.

Monday, October 9, 2017.

First, we will continue our refresher on necessary game theoretic concepts and terminology as needed — it may be helpful to review your notes and the Tadelis (2013) chapters from last week before class. We will then work through our first applied formal models in the Helmke and McLean (2014) and (as time permits) Ritter (2014) papers. We will conclude with a discussion on the interpretation of game theory, guided by the canonical Rubinstein (1991) article and more recent take by Svobik (2015).

- (★) Helmke, Gretchen and Elena V. McLean. 2014. "Inducing independence: A strategic model of World Bank assistance and legal reform." *Conflict Management and Peace Science* 31: 383-405.
- Ritter, Emily. 2014. "Policy Disputes, Political Survival, and the Onset and Severity of State Repression." *Journal of Conflict Resolution* 58: 143-168.
- Rubinstein, Ariel. 1991. "Comments on the Interpretation of Game Theory." *Econometrica* 59: 909-924.
- Svobik, Milan. 2015. "Equilibrium Analysis of Institutions." In *Routledge Handbook of Comparative Political Institutions*. Abingdon-on-Thames, UK: Routledge.
- Ashworth, Scott and Ethan Bueno de Mesquita. 2006. "Monotone Comparative Statics for Models of Politics." *American Journal of Political Science* 50: 214-231.
- ⊙ Assignment for 10/16/17: Following the steps covered in "How to Read a Formal Theory Paper," read and outline one of the models you pulled from your own area of research.

Making & Critiquing Modeling Assumptions; Formalizing the Informal.

Monday, October 16, 2017.

What are the assumptions we make when writing a formal model and are they justified? How do they affect the usefulness of the model? In addition to addressing some of the most common (and important) critiques of formal modeling, we will work through two simple models in the Gehlbach (2006) and Carrubba et al. (2008) papers — both of which set out to take general consensus theories in the social sciences and “formalize” them to test their internal logic and consistency.

- Hindriks, Frank A. 2006. “Tractability Assumptions and the Musgrave-Maki Typology.” *Journal of Economic Methodology* 13: 401-423.
- Frederick, Shane, George Loewenstein, and Ted O’Donoghue. 2002. “Time Discounting and Time Preference.” *Journal of Economic Literature* 40: 351-401.
- Carrubba, Cliff, Matt Gabel, and Simon Hug. 2008. “Legislative Voting Behavior, Seen and Unseen: A Theory of Roll-Call Vote Section.” *Legislative Studies Quarterly* 33: 543-572.
- (★) Gehlbach, Scott. 2006. “A Formal Model of Exit and Voice.” *Rationality and Society* 18: 395-418.
- Hindriks, Frank A. 2008. “False Models as Explanatory Engines.” *Philosophy of the Social Sciences* 38: 334-360.
- Opp, Karl-Dieter. 1999. “Contending Conceptions of the Theory of Rational Action.” *Journal of Theoretical Politics* 11: 171-202.
- McCubbins, Matthew D. and Michael F. Thies. 1996. “Rationality and the Foundations of Positive Political Theory.” *Leviathan* 19: 7-32.
- Assignment for 10/23/17: Prepare presentation for first workshop on 10/23. Each student will be allotted 10-15 minutes to present your motivation, model set-up (premises, preferences of actors, sequence, information, dynamics, etc.), and expected results.

Workshop # 1.

Monday, October 23, 2017.

Adapting Formal Models, Part I — Simple Games

Monday, October 30, 2017.

For the next three classes we will be reading and discussing some “workhorse” formal models that have been successfully re-used with minor adaptations across a variety of applications in the social sciences. While the substantive research topics may not always be of interest, your focus should be on the structure of the models and the techniques executed by their authors. In particular, note the role played by cutpoints and thresholds (particularly in the Stokes piece) and how Nichter (2008) uses a substantive understanding of the idea to adapt the model and insight from Stokes (2005). It is important to read Stokes (2005) before Nichter (2008). The Krehbiel (2016) piece is a slight departure, but exposes you to a common and tractable representation of actors’ utilities and a very effective use of a plot of the equilibrium space (p. 995).

- Stokes, Susan. 2005. “Preverse Accountability: A Formal Model of Machine Politics with Evidence from Argentina.” *American Political Science Review* 99: 315-325.
- (★) Nichter, Simeon. 2008. “Vote Buying or Turnout Buying? Machine Politics and the Secret Ballot.” *American Political Science Review* 102: 19-31.
- Krehbiel, Jay N. 2016. “The Politics of Judicial Hearings: The Role of Public Oral Hearings in the German Constitutional Court.” *American Journal of Political Science* 60: 990-1005.
- Ainsley, Caitlin. 2017. “The Politics of Central Bank Appointments.” *Journal of Politics* Forthcoming.
- Helmke, Gretchen. 2016. “From Power Gaps to Instability Traps: Reflections on Institutional Instability in Latin America.” *Working Paper*.
- Kennard, Amanda. 2017. “Firms’ Support for Climate Change Legislation: Industry Competition and the Emergence of Green Lobbies.” *Working Paper*.

Adapting Formal Models, Part II — Spatial Models & Bargaining.

Monday, November 6, 2017.

We shift our attention this week to a different class of models widely used in theories of policymaking and appointments: spatial models. Ferejohn and Shipan (1990) is a canonical model much work has been based on and you should be comfortable with the structure and insights. Both Chang (2001) and Sen and Spaniel (2017) develop models of appointments — when reading through them, focus on the slight changes the authors make so that the model reflects the relevant features of each institution. Finally, we will work through the first half of the Thrower (2017) working paper in preparation for next week where we will see the implications of relaxing the assumption of complete information.

- Ferejohn, John and Charles Shipan. 1990. "Congressional Influence on Bureaucracy." *Journal of Law, Economics, and Organization* 6: 1-20.
- Chang, Kelly H. 2001. "The President Versus the Senate: Appointments in the American System of Separated Powers and the Federal Reserve." *Journal of Law, Economics, and Organization* 17: 319-355.
- Sen, Maya and William Spaniel. 2017. "How uncertainty about judicial nominees can distort the confirmation process." *Journal of Theoretical Politics* 29: 22-47.
- (★) Thrower, Sharece. 2017. "Inter-Branch Conflict and Policy Implementation: Instructing Agencies with Presidential Signing Statements." *Working Paper*. ⇒ pp. 1-14 ONLY
- ⊗ Gehlbach, Scott. 2013. "Delegation." In *Formal Models of Domestic Politics*. Cambridge: Cambridge University Press. ⇒ pp. 98-116
- Hitt, Matthew P., Craig Volden, and Alan E. Wiseman. 2017. "Spatial Models of Legislative Effectiveness." *American Journal of Political Science* 61: 575-590.
- Assignment for 11/13/17: Each of you will be assigned an additional paper to read for next week for which you will write a referee report. Your referee reports should be no more than two pages double-spaced and describe the motivation, central question, contribution, and provide and defend a critique. If you think something is done well or poorly, you need to explain why.

Adapting Formal Models, Part III — Incomplete Information.

Monday, November 13, 2017.

Until this point, the models we've been working with have assumed everyone was completely informed. In practice, this is not exceedingly realistic and models that relax this assumption are very common in the social science literature. The second half of the Thrower (2017) working paper demonstrates with a model we already know the implications of relaxing this assumption. The Fang (2008) paper is hard, but I want you to read it carefully because it is very clearly written with a thorough appendix. If you can understand the steps, this framework is very flexible and powerful. The Wolford (2014) paper is similar to Fang (2008) in machinery, and provides an example of how we can easily introduce a third player into our models. In light of the results in these papers, we will discuss the often levied criticism of formal modeling concerning multiple equilibria and selection criterion.

- Thrower, Sharece. 2017. "Inter-Branch Conflict and Policy Implementation: Instructing Agencies with Presidential Signing Statements." *Working Paper*. ⇒ pp. 14-25, plus appendix.
- Fang, Songying. 2008. "The Informational Role of International Institutions and Domestic Politics." *American Journal of Political Science* 52: 304-321.
- (★) Wolford, Scott. 2014. "Showing Restraint, Signaling Resolve." *American Journal of Political Science* 58: 144-156.
- ⊗ Tadelis, Steven. 2013. "Dynamic Games of Incomplete Information." In *Game Theory: An Introduction*. Princeton: Princeton University Press. ⇒ pp. 303-314, 318-335.
- Staton, Jeffrey K. 2006. "Constitutional Review and the Selective Promotion of Case Results." *American Journal of Political Science* 50: 98-112.
- Gailmard, Sean and John W. Patty. 2012. "Formal Models of Bureaucracy." *Annual Review of Political Science* 15: 353-377.
- Bendor, Jonathan and Adam Meirowitz. 2004. "Spatial Models of Delegation." *American Political Science Review* 98: 293-310.

Presenting Models and Theories.

Monday, November 20, 2017.

The readings for this week take a variety of approaches in their written presentation of formal models, which is an important aspect for you to think about in terms of both writing your own and evaluating others. The Kono (2006) article employs a "numerical solution," which is a powerful (if at times controversial) technique to derive implications from complex models. In addition to discussing the merits, I will demonstrate some techniques in Mathematica. Both Bawn (1995) and Graham et al. (2017) are mathematically more complicated than many we've seen, but demonstrate well the use of randomly distributed variables and reduction of complex relationships into a straightforward equilibrium plots.

- Kono, Daniel Y. 2006. "Optimal Obfuscation: Democracy and Trade Policy Transparency." *American Political Science Review* 100: 369-384.
- Bawn, Kathleen. 1995. "Political Control Versus Expertise: Congressional Choices about Administrative Procedures." *American Political Science Review* 89: 62-73.
- Graham, Benjamin, Noel P. Johnston, and Allison F. Kingsley. 2017. "Even Constrained Governments Take: The Domestic Politics of Transfer and Expropriation Risks." *Journal of Conflict Resolution* Forthcoming.
- Rogers, James R. and Georg Vanberg. 2002. "Judicial Advisory Opinions and Legislative Outcomes in Comparative Perspective." *American Journal of Political Science* 46: 379-397.
- Assignment for 11/27/17: Prepare presentation for second workshop on 11/27. Students will give 10 minute presentations of their projects followed by 5-10 minutes of questions and class discussion. At this stage, the project should include a solved baseline model and at minimum thoughts on extensions of the model and/or moving towards derivation of comparative statics and empirical implications.

Workshop # 2.

Monday, November 27, 2017.

Empirical Implications of Theoretical Models.

Monday, December 4, 2017.

For our final class, we will have a seminar discussion about the usefulness of models and their role in research design. This is open for debate with smart people falling along the entire spectrum, so I want to push you to develop opinions of your own as to where you fall on this and why formal models are or are not productive in your areas of research. The readings for this week speak primarily to how we should think about "testing" theories (if that is even the point) and how extant and new formal models may inform different types of research.

- Ashworth, Scott, Christopher Berry, and Ethan Bueno de Mesquita. 2015. "All Else Equal in Theory and Data (Big and Small)." *Political Science and Politics* 48: 89-94.
- Lorentzen, Peter, M. Taylor Fravel, and Jack Paine. 2017. "Qualitative Investigation of Theoretical Models." *Journal of Theoretical Politics* 29: 467-491.
- Card, David, Stefano DellaVigna, and Ulrike Malmendier. 2011. "The Role of Theory in Field Experiments." *Journal of Economic Perspectives* 25: 1-25.
- Lovett, Frank. 2006. "Rational Choice Theory and Explanation." *Rationality and Society* 18: 237-272.
- Ish-Shalom, Piki. 2009. "Theorizing Politics, Politicizing Theory, and the Responsibility That Runs Between." *Perspectives on Politics* 7: 303-316.
- Granato, Jim, Melody Lo, and M.C. Sunny Wong. 2010. "A Framework for Unifying Formal and Empirical Analysis." *American Journal of Political Science* 54: 783-797.