

## **COMPUTATIONAL ECONOMICS**

We will study the specification, computation, estimation and interpretation of “structural” models that are widely used in applied microeconomics. The focus will be on how to use these models in practice, and students will solve and estimate models in weekly problem sets. We will discuss their limitations, as well as why they can be extremely useful. The course is also part of the Industrial Organization sequence and, for the most part, we will focus on models that originated in IO. However, we will look at non-IO applications, based on class interest.

**NB.** While some familiarity with a programming language such as GAUSS, MATLAB or R will be required to do the problem sets, great expertise is not required. Consistent with this, the emphasis will be on understanding the models and methods that applied economists can use in their research, rather than on developing tools that will only be used by the computational specialist.

**Contact details:** Tydings 3135, telephone number 301-405-8325.

**Assessment/grading:** Weekly computational problem sets 60%, a structured research proposal 30%<sup>1</sup>, referee report 10%.

**Office hours:** Tuesday 9:30-10:30, but we can make a separate arrangement if you have a well-defined question. Problem sets will normally be handed out and collected on Wednesdays. We will hold a meeting immediately prior to class one day each week to discuss the problem sets.

**Materials:** I will distribute lecture slides (via ELMS) prior to class. The vast majority of the material is on these slides, but you will be required to do some reading prior to most classes and for the problem sets. For pre-class reading of papers the aim is to get the ‘big picture’ of what is going on, rather than focusing on details.

There is no required textbook. However, there are some useful books that you may want to look at.

For background on computational techniques:

Ken Judd, *Numerical Methods in Economics*, 1998

Ken Train, *Discrete Choice Methods with Simulation*, available on his Berkeley website (especially useful for demand/single-agent choice models).

Mario Miranda and Paul Fackler, *Applied Computational Economics and Finance*, 2004 (note there is a computational economics toolbox for MATLAB that accompanies the book).

For background on empirical issues:

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<sup>1</sup> My intention is to use one of the Wharton Consumer Analytics Initiatives opportunities where academic submit proposals to access data supplied by firms. <http://wcai.wharton.upenn.edu/research-opportunity/>. Usually a couple of new opportunities arise each semester, but none are currently scheduled. If no new opportunities arise we will try to make use of one of the older proposals.

Peter Davis and Eliana Garces, *Quantitative Techniques for Competition and Antitrust Analysis*, Princeton, 2010 (an excellent guide to how economics and econometrics are used in the real-world).

William Greene, *Econometric Analysis* or Jeffrey Wooldridge, *Econometric Analysis of Cross-Section and Panel Data* (econometric references)

Auction specialists should get a copy of:

Harry Paarsch, Han Hong and M Ryan Haley, *An Introduction to the Structural Econometrics of Auction Data*, 2006, MIT Press

If you are taking IO as a field, you should also look at:

Jean Tirole, *The Theory of Industrial Organization*, MIT, 1987 (a must-have and a must-read if you want to do IO research).

Paul Belleflamme and Martin Peitz, *Industrial Organization: Markets and Strategies*, Cambridge University Press, 2010 (useful for more recent IO theory).

Three useful Handbook chapters are:

D. Akerberg, L. Benkard, S. Berry and A. Pakes, *Econometric Tools for Analyzing Market Outcomes*

U. Dorazelski and A. Pakes, *A Framework for Applied Dynamic Analysis in IO*

J. Rust, *Numerical Dynamic Programming*

**Attendance:** if you are taking the course for credit and plan to miss more than one or two lectures please let me know. Students should attend the Tuesday afternoon seminar in weeks that I will indicate.

## OUTLINE AND READINGS

The course is divided into 5 parts, reflecting different types of models. In the process of covering a particular type of model we will discuss some more general computational issues that we will see again in later parts of the course, often in more complicated settings. The following table gives a rough idea how the economic and computational topics are going to mix:

<b>Modeling Topic</b>	<b>Computational/Econometric Topics</b>
1. Static Single Agent Choice Models/Demand	Optimization Solving nonlinear equations Numerical integration using simulation MPEC Moment inequalities Machine Learning
2. Static Games (i.e., multi-agent choice models)	Solving nonlinear equations Homotopy methods for finding all solutions Two-step estimation methods Moment inequalities
3. Auction, Bargaining, Matching and Signaling Models	Inequality estimators Solving differential equations
4. Dynamic Single Agent Choice Models/Demand	Dynamic programming with discrete state spaces Integration and Importance Sampling Dynamic programming with continuous action spaces (approximation)
5. Dynamic Games	More on homotopy methods and two-step techniques; continuous time



## READINGS

Note: we will only explicitly discuss a subset of the readings below. However, someone going on the IO job market should have some familiarity with all of the papers on this list.

### **PART I. Static Single Agent Choice Models/Demand**

Coverage: specification and estimation of demand for homogenous products (use of instruments). Specification and estimation of demand for differentiated products, primarily using discrete choice models, either using individual or aggregate data. Alternative estimation methods (BLP-Nevo, MPEC, moment inequalities). Calculation of welfare, and methods for getting reasonable welfare estimates. Machine Learning methods (application: internet datasets). Endogenizing product characteristics.

*Main Readings and Applications:*

Davis and Garces, Chapter 9, 6.2

R. Porter, "A Study of Cartel Stability: The Joint Executive Committee, 1880-1886", *Bell Journal of Economics*, Autumn 1983, 301-14

G. Ellison and S. Ellison, "Search, Obsfuscation and Price Elasticities on the Internet", *Econometrica*, March 2009, 427-452

S. Berry, J. Levinsohn, and A. Pakes, "Automobile Prices in Market Equilibrium", *Econometrica*, July 1995, 841-990

A. Nevo, "Measuring Market Power in the Ready-to-Eat Cereal Industry", *Econometrica*, March 2001, 307-342

S. Berry, "Estimating Discrete-Choice Models of Product Differentiation", *RAND*, Summer 1994, 242-262

A. Petrin, "Quantifying the Benefits of New Products: The Case of the Minivan," *JPE*, 110(4), 2002, 705-729.

J-P Dube, J Fox and C-L Su, "Improving the Numerical Performance of BLP Static and Dynamic Discrete Choice Random Coefficients Demand Estimation", *Econometrica*, 80(5), September, 2012, 2231-2267

A Pakes, "Alternative Models for Moment Inequalities", 2010 (became the Frisch Lecture paper in *Econometrica*)

K Ho and A Pakes, "Hospital Choices, Hospital Prices, and Financial Incentives to Physicians", *AER*, 2014, 3841-3884

Brad Shapiro, "Positive Spillovers and Free Riding in the Advertising of Prescription Pharmaceuticals", *AER*, forthcoming

B Handel, "Adverse Selection and Inertia in Health Insurance Markets: When Nudging Hurts", *AER*, 103(7), 2013, 2643-2682

*Additional Readings:*

- T. Bresnahan, "The Oligopoly Solution is Identified", *Economics Letters*, 1980, 10, 87-92 (the following paper by Lau is also relevant)
- T. Bresnahan, "Empirical Studies of Industries with Market Power", *Handbook of Industrial Organization*, Vol. 2, Chapter 17
- C. Wolfram, "Measuring Duopoly Power in the British Electricity Spot Market", *AER*, September 1999, 805-26 (see related papers by R. Green and D. Newbery (1992), "Competition in the British Electricity Spot Market", *JPE*; and A. Sweeting (2007), "Market Power in the England and Wales Electricity Wholesale Market 1995-2000", *Economic Journal*)
- S. Borenstein, J. Bushnell and F. Wolak, "Measuring Market Inefficiencies in California's Restructured Wholesale Electricity Market", *AER*, December 2002, 1396-405.
- G. Ellison, "Theories of Cartel Stability and the Joint Executive Committee", *RJE*, Spring 1994, 37-57 (follow up to the Porter paper)
- K. Corts, "Conduct Parameters and the Measurement of Market Power", *Journal of Econometrics*, November 1998, 227-50.
- D. Genesove and W. Mullin, "Testing Static Oligopoly Models: Conduct and Cost in the Sugar Industry, 1890-1914," *RAND*, Summer 1998, 355-77.
- S. Anderson, A. dePalma and J. Thisse (1992), *Discrete Choice Theory of Product Differentiation*, 1992, Cambridge and London, MIT Press.
- T. Bresnahan, "Competition and Collusion in the American Automobile Market: The 1955 Price War", *Journal of Industrial Economics*, 1982, 457-482 (well worth reading)
- D. McFadden, "Econometric Analysis of Qualitative Response Models," in Griliches and Intilligator (eds.), *Handbook of Econometrics*, Volume III, 1984 Amsterdam: North-Holland.
- P. Goldberg, "Product Differentiation and Oligopoly in International Markets: The Case of the U.S. Automobile Industry", *Econometrica*, 1995, 891-951
- J. Hausman, "Valuation of New Goods Under Perfect and Imperfect Competition," in Bresnahan and Gordon (eds) *The Economics of New Goods*, Studies in Income and Wealth, 1996, Vol. 58, Chicago: NBER. Including comment by Bresnahan (in the same volume) and replies.
- M. Trajtenberg, "The Welfare Analysis of Product Innovations, with an Application to Computed Tomography Scanners," 1999, 444-79
- A. Nevo, "New Products, Quality Changes and Welfare Measures Computed from Estimated Demand Systems," *Review of Economics and Statistics*, 2003, 85(2), 266-275.
- D. Akerberg and M. Rysman., "Unobservable Product Differentiation in Discrete Choice Models: Estimating Price Elasticities and Welfare Effects," *RAND*, Winter 2005, 771-788.

## **PART II. Static Games**

Coverage: solving Bertrand and Cournot games (continuous choices). Theoretical models of market entry (incl. Sutton/'one smart agent'). Specification and estimation of entry models (discrete choice), with symmetric or asymmetric players and different information assumptions. Multiple equilibria and how to deal with them. Two step and full solution methods. Models for insurance markets (implications for pricing).

### *Main Readings and Applications:*

Davis and Garces, p. 256-282

Aviv Nevo, "Mergers with differentiated products: the case of the ready-to-eat cereal industry", RAND, 2000, 31(3), 395-421

C Knittel and K Metaxoglou (2011), "In Search of the Truth: Merger Simulations Using Random Coefficient Logit Models"

Tirole, chapters 7, 8

N.G. Mankiw and M.D. Whinston, "Free Entry and Social Inefficiency," RJE, 1986, 48-58,

J. Sutton, "One Smart Agent", RAND, 1997, 605-628

T. Bresnahan and P. Reiss, "Entry and Competition in Concentrated Markets," Journal of Political Economy, 99 (October 1991), pp. 977-1009

S. Berry, "Estimation of a Model of Entry in the Airline Industry", Econometrica, 1992, 889-918,

K. Seim, "Spatial Differentiation and Firm Entry: The Video Retail Industry," RJE, 2006, 619-640

P. Bajari, H. Hong, J. Krainer, D. Nekipelov, "Estimating Static Models of Strategic Interactions", 2010, JBES, 28, 469-482

C-L Su and K. Judd, "Constrained Optimization Approaches to Estimation of Structural Models", Econometrica, Sept 2012

A. Sweeting, "The strategic timing incentives of commercial radio stations: An empirical analysis using multiple equilibria", RAND, 2009, 710-742

R. Borkovsky, U. Doraszelski and Y. Kryukov, "A User's Guide to Solving Dynamic Stochastic Games Using the Homotopy Method", Operations Research, 58(4), pp. 1116-1132

M Grennan, "Price Discrimination and Bargaining: Empirical Evidence from Medical Devices", American Economic Review, 2013m 103(1), 145-177

L Einav, A Finkelstein and J Levin, "Beyond Testing: Empirical Models of Insurance Markets", annual Review of Economics, 2, 311-336, 2010

R Lee, "Insurer Competition in Health Care Markets", 2015

A Yurukoglu and G Crawford, "The Welfare Effects of Bundling in Multichannel Television Markets", AER, 102(2), 2012

A Yurukoglu, G Crawford, R Lee and M Whinston, "The Welfare Effects of Vertical Integration in Multichannel Television Markets", 2015

B Handel, "Equilibria in Health Exchanges: Adverse Selection vs. Reclassification Risk", Econometrica, 83(4), 2015, 1261-1313

*Additional Readings:*

J. Sutton, Sunk Costs and Market Structure, 1991, MIT Press, chapters 1-3 and industry studies in chapters 6, 8, 9

J. Sutton, Technology and Market Structure, 2001, MIT Press

T. Bresnahan, "Sutton's 'Sunk Costs and Market Structure: Price Competition, Advertising, and the Evolution of Concentration': Review Article," RJE, 1992, 23(1), 137-52,

J. Sutton, "Gibrat's Legacy", JEL, 1992, 35(1), 40-59  
(more details of Sutton's model of the size distribution are contained in Technology and Market Structure and an LSE STICERD working paper EI/9 "The Size Distribution of Businesses, Part I", 1995)

T. Dunne, M. Roberts and L. Samuelson, "Patterns of Firm Entry and Exit in US Manufacturing", 1988, RJE, 495-515,

Bart J. Bronnenberg, Sanjay K. Dhar, and Jean Pierre H. Dubé, "Brand History, Geography, and the Persistence of Brand Shares", JPE, 2009, 87-115

J. Chevalier, "Capital Structure and Product Market Competition: Empirical Evidence from the Supermarket Industry", American Economic Review, 1995, 85(3), 415-435.

P. Ellickson, "Supermarkets as A Natural Oligopoly", mimeo, 2004

T. Bresnahan and P. Reiss, "Entry in Monopoly Markets," Review of Economic Studies, 1990, 531-53

M. Mazzeo, "Product Choice and Oligopoly Market Structure," RAND Journal of Economics, 2002, 221-42

P. Bajari, H. Hong and S. Ryan, "Identification and Estimation of Discrete Games of Complete Information", Econometrica, Sept 2010, 78(5), 1529-1568

T. Bresnahan and P. Reiss, "Measuring the Importance of Sunk Costs", Annales d'Economie et de Statistique, 1994, 34, 181-217

S. Berry and J. Waldfogel, "Free Entry and Social Inefficiency in Radio Broadcasting" Rand Journal of Economics, 30 (Autumn 1999), 397-420



S. Berry, A. Eizenberg and J. Waldfogel, "Optimal Product Variety in Radio Markets", 2013, mimeo

P. Jia, "What Happens When Wal-Mart Comes to Town? An Empirical Analysis of the Discount Retail Industry", *Econometrica*, 2008, 76(6), 1263-1316

F. Ciliberto and E. Tamer, "Market Structure and Multiple Equilibria in Airline Markets", *Econometrica*

Ariel Pakes, J. Porter, K. Ho and J. Ishii, "Moment Inequalities and Their Application", 2006, Harvard

J. Ishii, "Compatibility, Competition, and Investment in Network Industries: ATM Networks in the Banking Industry", 2005

R. Lee and A. Pakes, "Multiple Equilibria and Selection by Learning in an Applied Setting", *Economic Letters*, 2009, 104(1), 13-16

K. Ho, "Insurer-Provider Networks in the Medical Care Market", *AER*, 2008

### **PART III. (a) Auction Models**

Coverage: solving and estimating first-price auction models with and without unobserved heterogeneity, with and without selective entry.

H Paarsch, H Hong and M Ryan Haley, An Introduction to the Structural Econometrics of Auction Data, 2006, MIT Press

E Guerre, I Perrigne and Q Vuong, “Optimal Nonparametric Estimation of First-Price Auctions”, *Econometrica*, May 2000, 68(3), 525-574

W-R Gayle and J-F Richard, “Numerical Solutions of Asymmetric, First-Price Independent Private Values”, 2008, *Computational Economics*, 32, 245-278

T Hubbard, R Kirkegaard and H Paarsch, “Using Economic Theory to Guide Numerical Analysis: Solving for Equilibria in Models of Asymmetric First-Price Auctions”, *Computational Economics*, 2013, 42(2), 241-266

T Hubbard and H Paarsch, “On the Numerical Solution of Equilibria in Auction Models with Asymmetries within the Private-Values Paradigm”, 2013, *Handbook of Computational Economics*

T Hubbard and H Paarsch, “Investigating bid-preferences at low-price, sealed-bid auctions with endogenous participation”, 2009, *IJIO*, 1-14

V Bhattacharya, J Roberts and A Sweeting, “Regulating Bidder Participation in Auctions”, *RAND*, forthcoming

J Roberts and A Sweeting, “When Should Sellers Use Auctions?”, *AER*, 2013

E Krasnokutskaya, “Identification and Estimation of Auctions Models with Unobserved Heterogeneity”, *ReStud*, 28, 2011

### **(b) Matching Models**

Coverage: a brief introduction to matching models and applications. Cases with and without explicit matching mechanisms. Maximum score.

N Agarwal, “An Empirical Model of the Medical Match”, 2014, mimeo

J Fox, “Structural Empirical Work Using Matching Models”, *New Palgrave Dictionary of Economics*, 2009

P Bajari and J Fox, “Measuring the Efficiency of an FCC Spectrum Auction”, *American Economic Journal: Microeconomics*, 2013, 5(1), 100–146

J Fox, “Identification in Matching Games”, *Quantitative Economics*, 2010

### **(c) Signaling and Screening Models**

C Gedge, J Roberts and A Sweeting, "A Model of Dynamic Limit Pricing with an Application to the Airline Industry", 2014, mimeo

I Perrigne and Q Vuong, "Non-linear pricing in Yellow Pages", 2010, mimeo

#### **PART IV. Single-Agent Dynamic Choice Models**

Coverage: numerical dynamic programming (value function and policy function iteration). Rust bus engine example. Alternative estimation methods (full solution and two-step or iterated CCPs). Methods for dealing with unobserved heterogeneity and 'reducing the state space'. Approximation methods for problems with continuous states. Models of learning for experience goods.

##### *Main Readings and Applications:*

J Rust, "Optimal Replacement of GMC Bus Engines: An Empirical Model of Harold Zurcher", *Econometrica*, 55(5), 1987, pp. 999-1033

V. J Hotz and R Miller, "Conditional Choice Probabilities and the Estimation of Dynamic Models", *Review of Economic Studies*, Vol. 60, No. 3 (Jul., 1993), pp. 497-529

P. Arcidiacono and R. Miller, "CCP estimation of dynamic models with unobserved heterogeneity," *Econometrica*, Nov 2011, 79(6), 1823-1867

A Pakes, "Patents as Options: Some Estimates of the Value of Holding European Patent Stocks", *Econometrica*, 54(4), 1986, 755-784

V Aguirregabiria and A. Nevo, "Recent Developments in Empirical IO: Dynamic Demand and Dynamic Games", 2012, forthcoming in *Advances in Economics and Econometrics*, 10<sup>th</sup> World Congress, Vol 3.

I. Hendel and A. Nevo, "Measuring the implications of sales and consumer inventory behavior". *Econometrica*, 2006, 74(6):1637-1673

I Hendel and A Nevo, "Intertemporal Price Discrimination in Storable Goods Markets", *AER*, 2013, 103(7): 2722-51

E Wang, "Estimating the Distributional Impacts of Taxes on Storable Goods: A Dynamic Demand Model with Random Coefficients", mimeo, 2013, U Mass

G. Crawford and M. Shum, "Uncertainty and learning in pharmaceutical demand", *Econometrica*, 2005, 73(4):1137-1173

J Rust, "Numerical Dynamic Programming" in *Handbook of Computational Economics*, 1996, Elsevier

A Nevo, J Turner and J Williams, "Usage-Based Pricing and Demand for Residential Broadband", 2013, mimeo

P Scott, "Dynamic Discrete Choice Estimation of Agricultural Land Use", 2013, mimeo

##### *Additional Readings:*

G. Gowrisankaran and M. Rysman, "Dynamics of consumer demand for new durable goods", *Journal of Political Economy*, 2012

P Schiraldi, "Automobile replacement: a dynamic structural approach", RAND, 2011, 42(2), 266-291 (IO/Environmental)

B. Gordon, "A Dynamic Model of Consumer Replacement Cycles in the PC processor industry", Marketing Science, 2009, 28(5), 846-867

J Lazarev, "The Welfare Effects of Intertemporal Price Discrimination", 2013, NYU

D. Akerberg, "Advertising, Learning, and Consumer Choice in Experience Good Markets: An Empirical Examination," International Economic Review, 2003, 1007-40.

## **PART V      Dynamic Games**

Coverage: solving dynamic games and trying to find all of the equilibria (homotopy methods). Estimation of dynamic games using two-step methods and evidence on their performance (BBL, POB, MPEC, AM). Continuous time and oblivious equilibria as methods for simplifying the solution of dynamic games.

### *Main Readings and Applications:*

R. Ericson and A. Pakes, "Markov-Perfect Industry Dynamics: A Framework for Empirical Work", *Review of Economic Studies*, 1995, 53-82

A. Pakes and P. McGuire, "Computing Markov-Perfect Nash Equilibria: Numerical Implications of a Dynamic Differentiated Product Model", *RAND*, 1994, 555-588.

P. Arcidiacono, P. Bayer, J. Blevins and P. Ellickson, "Estimation of Dynamic Discrete Choice Models in Continuous Time", 2013, mimeo

M. Pesendorfer and P. Schmidt-Dengler, "Sequential Estimation of Dynamic Discrete Games: A Comment", *Econometrica*, March 2010, 78(2), 833-842

P. Bajari, L. Benkard, J. Levin, "Estimating Dynamic Models of Imperfect Competition", *Econometrica*, 2007, 1331-1370

S. Berry, M. Ostovsky and A. Pakes, "Simple estimators for the parameters of discrete dynamic games (with entry/exit examples)", *RAND*, 2007, 373-399

M. Pesendorfer and P. Schmidt-Dengler, "Asymptotic Least Squares Estimators for Dynamic Games", *Review of Economic Studies*, 2008, 901-928

D. Besanko, U. Dorazelski, Y. Kryukov and M. Satterthwaite, "Learning, Organizational Forgetting and Industry Dynamics", *Econometrica*, 78(2), 2010, 453-508

G Weintraub, C L Benkard and B Van Roy, "Markov Perfect Industry Dynamics with Many Firms", 76(6), 2008, 1375-1411

G Weintraub, C L Benkard and B Van Roy, "Computational Methods for Oblivious Equilibrium", *Operations Research*, July 2010

B Ifrach and G Weintraub, "A Framework for Dynamic Oligopoly in Concentrated Industries", 2014

U Dorazelski, D Besanko, Y Kryukov, "The Economics of Predation: what Drives Pricing when there is Learning-By-Doing?", *AER*, 2013

L Benkard, P Jeziorksi and G Weintraub, "Oblivious Equilibrium for Concentrated Industries", forthcoming, *RAND*

### *Additional Readings:*

P. Schmidt-Dengler, "The Timing of New Technology Adoption: The Case of MRI", 2006, [http://personal.lse.ac.uk/schmidt1/mri\\_june.pdf](http://personal.lse.ac.uk/schmidt1/mri_june.pdf)

S. Ryan, "The Costs of Environmental Regulation in a Concentrated Industry", *Econometrica*, 80(3), 2012, 1019-1061

Y. Takahashi, "Estimating a War of Attrition: The Case of the US Movie Theater Industry", 2014, mimeo

A. Collard-Wexler, "Demand Fluctuations and Plant Turnover in Ready-Mix Concrete", *Econometrica*, 2013

C. Snider, "Predatory Incentives and Predation Policy: The American Airlines Case", 2009

A. Sweeting, "Dynamic Product Positioning in Differentiated Product Markets: The Effect of Fees for Musical Performance Rights on the Commercial Radio Industry", *Econometrica*, 2013

C L Benkard, A Bodoh-Creed and J Lazarev, "Simulating the Dynamic Effects of Horizontal Mergers: US Airlines", 2010, Stanford GSB

P Jeziorski, "Empirical Model of Dynamic Merger Enforcement: Choosing Ownership Caps in US Radio", mimeo, 2014

### Draft Schedule (subject to change)

WK 1	8/31/15	Introduction; Basics of Demand Estimation	9/2/15	Demand and Supply; Conduct
WK 2	9/7/15	No class	9/9/15	Discrete Choice Demand
WK 3	9/14/15	Discrete Choice Demand	9/16/15	Extensions: MPEC, Endogenous Product characteristics
WK 4	9/21/15	Inequalities	9/23/15	Machine learning
WK 5	9/28/15	Supply Side: Prices and Quantities	9/30/15	Bargaining
WK 6	10/5/15	Screening and Signaling Models	10/7/15	Static Discrete Choice Games
WK 7	10/12/15	Static Discrete Choice Games	10/14/15	Auctions
WK 8	10/19/15	Auctions	10/21/15	Auctions
WK 9	10/26/15	Matching	10/28/15	Catch-up
WK 10	11/2/15	Single Agent Dynamics	11/4/15	Single Agent Dynamics
WK 11	11/9/15	Single Agent Dynamics	11/11/15	Ericson Pakes Dynamic Games
WK 12	11/16/15	Ericson Pakes Dynamic Games	11/18/15	Estimation of EP Dynamic Games
WK 13	11/23/15	Estimation of EP Dynamic Games	11/25/15	Continuous Time Games
WK 14	11/30/15	Oblivious Equilibrium and Related Concepts	12/2/15	Oblivious Equilibrium and Related Concepts
WK 15	12/7/15	Catch-up	12/9/15	Catch-up