
Northwestern University
Mar Reguant
Econ 450-2

MW 10:00am-11:30am
Zoom
Winter 2021

Topics in IO - Econ 450-2

Course Description This course sequence provides a graduate-level topics class in Industrial Organization (IO). In this part of the sequence, I will focus on covering dynamics, multi-unit auctions, economic regulation, pass-through, and computational methods. I will emphasize applications in energy and environmental to show how to use these models and tools in practice. I will also emphasize some energy and environmental applications close to my research agenda.

Lecture notes and textbooks Most of the classes will be based on slides that will be made available through Canvas. I will occasionally use the blackboard. Even though the class will be mostly structured around papers, it will be essential that you read the assigned handbook chapters. Handbook chapters are an extraordinary resource to get started in a research area.

Grading Your course grade will be based on the weighted average of your weekly discussions/presentations (20%), problem sets (40%) and a referee reports (40%). Class participation will be taken into account at the margin, and included as part of the weekly discussions. Grading (and pretty much everything else in this syllabus) might be altered to deal with the uncertainties of Covid-19.

Assigned readings There will be required readings for each class, which will be marked with an asterisk (*). I strongly recommend you to do the readings before class, as it will allow you to understand the material better. Please, post one comment before each class on what you got from the reading. I might ask one of you to share your impressions briefly with the rest of the class during the class discussion.

Problem sets There will be two problem sets during the course and two referee reports. The problem sets will enable you to learn how to practically implement the methods learnt in class. Some of the problem sets might be tricky at first, but they will

force you to fight against the machine. You can work on the problem sets in groups of two to three people (collaboration is highly encouraged).

Other notes Please, reach out if you, like many of us, are struggling these days. My hope is that each of you will be able to learn as much as feasible considering the circumstances. That bar might be very different for each of you, and I plan to accommodate accordingly.

Calendar

DISCLAIMER. This calendar is tentative and incomplete. Please check most current version of class schedule on the Canvas module section.

Module 1 - Week 1: Single Agent Dynamics I

Methods. Applications.

- Section 3 in Akerberg, Benkard, Berry, and Pakes (2007) “Econometric tools for analyzing market outcomes”
- Judd, Ken.1998. Numerical Methods in Economics, MIT Press.
- Rust, John. 1996. Structural Estimation of Markov Decision Processes, Handbook of Econometrics, Volume 4, Chapter 51.
- Aguirregabiria and Mira (2010) “Dynamic discrete choice structural models: A survey”
- (*) Rust (1987) “Optimal replacement of GMC bus engines: An empirical model of Harold Zurcher”
- Hotz and Miller (1993) “Conditional Choice Probabilities and the Estimation of Dynamic Models”
- (*) Aguirregabiria and Mira (2002) “Swapping the Nested Fixed Point Algorithm: A Class of Estimators for Discrete Markov Decision Models”
- (*) Su and Judd (2012) “Constrained Optimization Approaches to the Estimation of Structural Models”

Module 1 - Week 2: Single Agent Dynamics II

Applications. Identification.

- (*) Hendel and Nevo (2006) “Measuring the Implications of Sales and Consumer Inventory Behavior,” *Econometrica* Vol. 74, No. 6 (Nov., 2006), pp. 1637-1673.
- (*) Kalouptsi, Myrto (2014) “Time to Build and Fluctuations in Bulk Shipping,” 2014, *American Economic Review*, 104(2): 564-608.
- (*) Arcidiacono and Miller (2011) “Conditional Choice Probability Estimation of Dynamic Discrete Choice Models With Unobserved Heterogeneity,” *Econometrica*, Volume 79, Issue 6, pages 1823-1867.
- (*) Scott (2013) “Dynamic Discrete Choice Estimation of Agricultural Land Use,” mimeo.
- Magnac and Thesmar (2002) “Identifying Dynamic Discrete Decision Processes,” *Econometrica*, 70, 801-816.
- Aguirregabiria, Victor. 2005. “Nonparametric Identification of Behavioral Responses to Counterfactual Policy Interventions in Dynamic Discrete Decision Processes,” *Economics Letters*.
- Kalouptsi, Myrto, Paul Scott and Eduardo Souza-Rodrigues (2015) “Identification of Counterfactuals and Payoffs in Dynamic Discrete Choice with an Application to Land Use.”

Module 2 - Week 1: Multiple Agent Dynamics I

Building blocks. Computational approaches and estimation.

- Reference: Dorazelski and Pakes (2007) “A Framework for Applied Dynamic Analysis in IO”
- (*) Ericson and Pakes, (1995) “Markov-Perfect Industry Dynamics: A Framework for Empirical Work,” *The Review of Economic Studies*, Vol. 62, No. 1, pp. 53-82
- (*) Pakes and McGuire (1994) “Computing Markov Perfect Nash Equilibrium: Numerical Implications of a Dynamic Differentiated Product Model”

- (*) Berry, Steven, Ariel Pakes and Michael Obstrovsky (2007) “Simple Estimators for the Parameters of Discrete Dynamic Games,” *RAND Journal of Economics*, v. 38(2), Summer 2007, pp. 373-399.
- (*) Bajari, Benkard and Levin (2007) “Estimating Dynamic Models of Imperfect Competition.”
- Doraszelski, Ulrich and Mark Satterthwaite (2010). “Computable Markov- perfect industry dynamics.” *The RAND Journal of Economics* 41.2, pp. 215-243.
- Besanko et al. (2010) “Learning-by-Doing, Organizational Forgetting, and Industry Dynamics,” *Econometrica* Volume 78, Issue 2, pages 453-508, March 2010.
- Pesendorfer, Martin and Philipp Schmit-Dengler (2004). “Least Squares Estimators for Dynamic Games,” *Review of Economic Studies*.
- Aguirregabiria and Mira (2007) “Sequential Estimation of Dynamic Discrete Games,” *Econometrica*, *Econometric Society*, vol. 75(1), pages 1-53, 01.

Module 2 - Week 2: Multiple Agent Dynamics II

Applications. Solutions to the curse of dimensionality.

- (*) Collard-Wexler, A. (2013) “Demand Fluctuations in the Ready-Mix Concrete Industry,” *Econometrica* (2013) pp. 1003-1037.
- (*) Ryan (2012) “The Costs of Environmental Regulation in a Concentrated Industry,” *Econometrica*.
- (*) Fowle, Reguant and Ryan (2016) “Pollution Permits and the Evolution of Market Structure,” *Journal of Political Economy*.
- (*) Weintraub, Benkard, and Van Roy (2008) “Markov Perfect Industry Dynamics with Many Firms,” *Econometrica*, Vol. 76, No. 6, 1375-1411.
- Fershtman C., Pakes A. (2012) “Dynamic Games with Asymmetric Information: A Framework for Empirical Work.” *Quarterly Journal of Economics*. 127 (4):1611-1661.
- Benkard, Jeziorski, and Weintraub (2015) “Oblivious Equilibrium for Concentrated Industries,” *The RAND Journal of Economics*, Vol. 46, No. 4, 671-708.

Module 3 - Week 1: Topics in Multi-unit Auctions and Electricity Markets I

Methods. Point and set identification. Applications.

- Hortaçsu (2013) “Recent progress in the empirical analysis of multi-unit auctions.” *International Journal of Industrial Organization*, Vol. 29, 345-349.
- (*) Hortaçsu and McAdams (2010) “Mechanism Choice and Strategic Bidding in Divisible Good Auctions: An Empirical Analysis of the Turkish Treasury Auction Market.” *Journal of Political Economy*, Vol. 118, No. 5, 833-865.
- Hortaçsu and Kastl (2012) “Valuing Dealers’ Information Advantage: A Study of Canadian Treasury Auctions.” *Econometrica*, Vol. 80, No. 6, 2511-2542.
- (*) Hortaçsu and Puller (2008) “Understanding strategic bidding in multi-unit auctions: a case study of the Texas electricity spot market”
- Wolak (2003). “Identification and estimation of cost function using observed bid data: an application to electricity markets.” In: *Advances in Economics and Econometrics: Theory and Applications, Eighth World Congress, Volume II*. Cambridge University Press, New York.

Module 3 - Week 2: Topics in Multi-unit Auctions and Electricity Markets II

Applications and extensions.

- Borenstein, Bushnell and Wolak (2002). “Measuring Market Inefficiencies in California’s Restructured Wholesale Electricity Market.” *American Economic Review*, 92 (5): 1376-1405.
- (*) Bushnell, Mansur, and Saravia (2008) “Vertical Arrangements, Market Structure, and Competition: An Analysis of Restructured US Electricity Markets.” *American Economic Review*, Vol. 98, No. 1, 237-266.
- Reguant (2014) “Complementary Bidding Mechanisms and Startup Costs in Electricity Markets.” *Review of Economic Studies*, 2014, 81(4): 1708-1742.
- Birge, Hortaçsu, Mercadal, and Pavlin (2018). “Limits to Arbitrage in Electricity markets: A case study of MISO.” *Energy Economics* 75, 518-533

- Mercadal (2018), “Dynamic Competition and Arbitrage in Electricity Markets: The Role of Financial Players.” Working paper (Revise and resubmit, AEJ: Microeconomics).
- (*) Fabra and Imelda (2020). “Market Power and Price Discrimination: Learning from Changes in Renewables Regulation”, working paper.
- (*) Ito and Reguant (2016) “Sequential Markets, Market Power and Arbitrage.” American Economic Review, 2016, 106(7):1921-1957
- Jofre-Bonet, and Pesendorfer (2003) “Estimation of a Dynamic Auction Game.” Econometrica, Vol. 71, No. 5, 1443-1489.
- Balat (2013) “Highway Procurement and the Stimulus Package: Identification and Estimation of Dynamic Auctions with Unobserved Heterogeneity.”

Module 4 - Week 1: Regulation I

Rate-of-return regulation. Theory and applications.

- (*) Fowle (2010) “Emissions Trading, Electricity Industry Restructuring, and Investment in Pollution Control.” American Economic Review, Vol. 100, No. 3.
- (*) Abito (2014) “Agency Costs in Environmental Regulation: Evidence from Regulated Electric Utilities”
- Cicala (2015) “When Does Regulation Distort Costs? Lessons from Fuel Procurement in U.S. Electricity Generation.” American Economic Review.
- (*) Timmins (2002) “Measuring the Dynamic Efficiency Costs of Regulators’ Preferences: Municipal Water Utilities in the Arid West.” Econometrica, 70(2), 603-629.
- (*) Lim, and Yurukoglu (2015) “Dynamic Natural Monopoly Regulation: Time Inconsistency, Moral Hazard, and Political Environments.” Journal of Political Economy.

Module 4 - Week 2: Regulation II

Rate-of-return regulation. Theory and applications.

- Blundell, Gowrisankaran, and Langer (2020). “Escalation of Scrutiny: The Gains from Dynamic Enforcement of Environmental Regulations.” Forthcoming, AER.
- Kang and Silveira (2020) “Understanding Disparities in Punishment: Regulator Preferences and Expertise.” Working paper, R&R JPE.
- (*) Duflo, Greenstone, Pande, and Ryan (2018). “The Value of Discretion in the Enforcement of Regulation: Experimental Evidence and Structural Estimates from Environmental Inspections in India.” *Econometrica*, 86 (6): 2123-2160.
- Duflo, Greenstone, Pande, and Ryan (2013). “Truth-telling by Third-party Auditors and the Response of Polluting Firms: Experimental Evidence from India.” *Quarterly Journal of Economics*, 128 (4): 1499-1545.
- Ryan (2020). “Contract Enforcement and Productive Efficiency: Evidence from the Bidding and Renegotiation of Power Procurement Contracts in India.” *Econometrica*, 88 (2): 383-424.

Module 5: Dynamics and electricity markets

Modeling short- and long-run dynamics in electricity markets.

- Cullen (2015). “Dynamic Response to Environmental Regulation in the Electricity Industry.” Working paper.
- Cullen and Reynolds (2017). “Market Dynamics and Investment in the Electricity Sector.” Working paper.
- Abito, Knittel, Metaxoglou, and Trindade (2020). “The Role of Output Reallocation and Investment in Coordinating Externality Markets.” Working paper.
- Weber (2019). “Dynamic Responses to Carbon Pricing in the Electricity Sector.” Working paper.
- Linn and McCormack (2019). “The roles of energy markets and environmental regulation in reducing coal-fired plant profits and electricity sector emissions.” *The RAND Journal of Economics*, 50: 733-767.
- Eisenberg (2019). “Regulatory Distortions and Capacity Investment: The Case of China’s Coal Power Industry.” Working paper.

Module 6: Pass-through

Theory and applications. Structural and reduced-form approaches.

- Goldberg and Hellerstein (2008) “A Structural Approach to Explaining Incomplete Exchange-Rate Pass-Through and Pricing-to-Market.” *American Economic Review* P&P, Vol. 98, No. 2, 423-429.
- (*) Nakamura and Zerom (2010) “Accounting for Incomplete Pass-through”
- Weyl and Fabinger (2013) “Pass-Through as an Economic Tool: Principles of Incidence under Imperfect Competition.” *Journal of Political Economy*
- (*) Fabra and Reguant (2014) “Pass-Through of Emissions Costs in Electricity Markets.” *American Economic Review*, Vol. 104, No. 9, 2872-2899.
- (*) Duggan, Starc, and Vabson (2014) “Who Benefits when the Government Pays More? Pass-Through in the Medicare Advantage Program,” NBER Working Paper.
- (*) Cabral, Geruso, and Mahoney (2014) “Does Privatized Health Insurance Benefit Patients or Producers? Evidence from Medicare Advantage,” NBER Working Paper.