

Economics 272a. Advanced Topics in Industrial Organization, Winter 2022

January 4, 2022

Tuesdays 5–7.30pm
Bunche Hall 9383

Instructor: Will Rafey (rafey@ucla.edu; Bunche Hall 8367).
Office hours by appointment.

Course website: <https://bruinlearn.ucla.edu/courses/111545>

Course description: This is an advanced topics course in industrial organization focused on the empirical analysis of models of market behavior. We will study how to specify, identify, and estimate such models, and apply them to study counterfactuals of economic interest. Topics covered include models of production, innovation, and entry and investment, and their application to the evaluation and design of various imperfect and incomplete markets in specific institutional contexts.

Prerequisites: This course assumes knowledge of the first-year economics PhD sequence, in particular microeconomic theory and econometrics. Other courses from the industrial organization sequence are very helpful (especially 271a) but not essential.

Requirements: Your grade will reflect

- Three problem sets (60%)
- Replication (20%)
- Final exam (20%)
- Participation (0%)

1. The problem sets will involve estimation/counterfactual empirical exercises, as well as conceptual exercises such as deriving model results and estimating equations. For the empirical exercises, while solutions will be posted in R, you are welcome to use any language (e.g., Python, Matlab, ...). What I care about is whether your code is clearly documented and replicable.

2. The replication will ask you to (a) replicate the main findings and (b) provide one extension (e.g., a different sample period, a change in the econometric specification, ...) of an empirical paper. It is due any day before the last day of the winter quarter (March 18).

3. The final exam is designed to assess a combination of your knowledge of remarks from lecture and the required readings, as well as aspects of the problem sets. It will be held in-class on the last day of classes (March 8).

4. There are no required reading responses. However, students will be asked to pick their favorite figure, table, equation, or sentence from one of the week's required papers and share it with the class.

Outline and readings:

PART I. PRODUCTION AND TECHNOLOGY

1. Identification and estimation of production functions

- *ACKERBERG, D., CAVES, K. and FRAZER, G. (2015). Identification properties of recent production function estimators. *Econometrica*, **83** (6), 2411–2451
- *OLLEY, G. S. and PAKES, A. (1996). The dynamics of productivity in the telecommunications equipment industry. *Econometrica*, **64** (6), 1263–1297.
- LEVINSOHN, J. and PETRIN, A. (2003). Estimating production functions using inputs to control for unobservables. *Review of Economic Studies*, **70**, 317–341.
- GRILICHES, Z. and MAIRESSE, J. (1995). Production functions: The search for identification. *NBER Working Paper*, **5067**.
- KLETTE, T. J. and GRILICHES, Z. (1996). The inconsistency of common scale estimators when output prices are unobserved and endogenous. *Journal of Applied Econometrics*, **11** (4), 343–361.
- BOND, S., HASHEMI, A., KAPLAN, G. and ZOCH, P. (2021). Some unpleasant markup arithmetic: Production function elasticities and their estimation from production data. *Journal of Monetary Economics*, **121**, 1–14.
- WALTERS, A. A. (1963). Production and cost functions: An econometric survey. *Econometrica*, **31** (1–2), 1–66.
- NERLOVE, M. (1963). *Measurement in Economics*, Stanford University Press, chap. 7. Returns to scale in electricity supply, pp. 167–198.
- CHRISTENSEN, L. and GREENE, W. (1976). Economies of scale in U.S. electric power generation. *Journal of Political Economy*, **84** (4), 655–676.
- MARSCHAK, J. and ANDREWS, W. (1944). Random simultaneous equations and the theory of production. *Econometrica*, **12** (3–4), 143–205.

2. Tests for misallocation

- *SYVERSON, C. (2004). Market structure and productivity: A concrete example. *Journal of Political Economy*, **112** (6), 1181–1222.
- FOSTER, L., HALTIWANGER, J. and SYVERSON, C. (2008). Reallocation, firm turnover, and efficiency: Selection on productivity or profitability? *American Economic Review*, **98** (1), 394–425.
- HSIEH, C.-T. and KLENOW, P. (2009). Misallocation and manufacturing TFP in China and India. *The Quarterly Journal of Economics*, **74** (4), 1403–1448.
- —, — and LOECKER, J. D. (2014). Dynamic inputs and resource (mis)allocation. *Journal of Political Economy*, **122** (5), 1013–1063.
- *ASKER, J., COLLARD-WEXLER, A. and DE LOECKER, J. (2019). (Mis)allocation, market power, and global oil extraction. *American Economic Review*, **109** (4), 1568–1615.
- ADAMOPOULOS, T., BRANDT, L., LEIGHT, J. and RESTUCCIA, D. (2021). Misallocation, selection and productivity: A quantitative analysis with micro data from China. *NBER Working Paper*, **revised**.

3. Innovation and production

- *BENKARD, C. L. (2000). Learning and forgetting: The dynamics of aircraft production. *American Economic Review*, **90** (4), 1034–1054.
- DORASZELSKI, U. and JAUMANDREU, J. (2013). R&D and productivity: Estimating endogenous productivity. *The Review of Economic Studies*, **80**, 1338–1383.
- *— and — (2018). Measuring the bias of technological change. *Journal of Political Economy*, **126** (3), 1027–1084.
- DE LOECKER, J. and COLLARD-WEXLER, A. (2015). Reallocation and technology: Evidence from the U.S. steel industry. *American Economic Review*, **105** (1), 131–171.
- COVERT, T. (2015). Experiential and social learning in firms: The case of hydraulic fracturing in the Bakken shale. *Working paper*.
- IGAMI, M. (2017). Estimating the innovator’s dilemma: Structural analysis of creative destruction in the hard disk drive industry, 1981–1998. *Journal of Political Economy*, **125** (3), 798–847.

4. Entry and investment

- *RYAN, S. (2012). The costs of environmental regulation in a concentrated industry. *Econometrica*, **80** (3), 1019–1061.
- BRESNAHAN, T. and REISS, P. (1991). Entry and competition in concentrated markets. *Journal of Political Economy*, **99** (5), 977–1009.
- BERRY, S. (1992). Estimation of a model of entry in the airline industry. *Econometrica*, **60** (4), 889–917.
- BAJARI, P., BENKARD, C. L. and LEVIN, J. (2007). Estimating dynamic models of imperfect competition. *Econometrica*, **75** (5), 1331–1370.
- PAKES, A., OSTROVSKY, M. and BERRY, S. (2007). Simple estimators for the parameters of discrete dynamic games (with entry/exit examples). *The RAND Journal of Economics*, **38** (2), 373–399.
- AGUIRREGABIRIA, V. and MIRA, P. (2007). Sequential estimation of dynamic discrete games. *Econometrica*, **75** (1), 1–53.
- *KALOUPTSIDI, M. (2014). Time to build and fluctuations in bulk shipping. *American Economic Review*, **104** (2), 564–608.
- COLLARD-WEXLER, A. (2013). Demand fluctuations in the ready-mix concrete industry. *Econometrica*, **81** (3), 1003–1037.
- — (2004). A dynamic analysis of the market for wide-bodied commercial aircraft. *Review of Economic Studies*, **71** (3), 581–611.

PART II. MARKET FAILURES AND DESIGN

5. Engineering markets for electricity flows

- *WILSON, R. (2002). Architecture of power markets. *Econometrica*, **70** (4), 1299–1340.
- *BORENSTEIN, S., BUSHNELL, J. and WOLAK, F. (2002). Measuring market inefficiencies in California’s restructured wholesale electricity market. *American Economic Review*, **92** (5), 1376–1405.
- FABRIZIO, K., ROSE, N. and WOLFRAM, C. (2007). Do markets reduce costs? Assessing the impact of regulatory restructuring on U.S. electric generation efficiency. *American Economic Review*, **97** (4), 1250–1277.

- —, LEWIS, G. and PAKES, A. (2018). Just starting out: Learning and equilibrium in a new market. *American Economic Review*, **108** (3), 565–615.
- GOWRISANKARAN, G., REYNOLDS, S. and SAMANO, M. (2018). Intermittency and the value of renewable energy. *Journal of Political Economy*, **124** (4), 1187–1234.

6. Designing markets for pollution

- WEITZMAN, M. (1974). Prices vs. quantities. *Review of Economic Studies*, **41** (4), 477–491.
- HAHN, R. (1984). Market power and transferable property rights. *The Quarterly Journal of Economics*, **99** (4), 753–765.
- JOSKOW, P., SCHMALENSEE, R. and BAILEY, E. (1998). The market for sulfur dioxide emissions. *American Economic Review*, **88** (4), 669–685.
- *CARLSON, C., BURTRAW, D., CROPPER, M. and PALMER, K. (2000). Sulfur dioxide control by electric utilities: What are the gains from trade? *Journal of Political Economy*, **108** (6), 1292–1326.
- *MULLER, N. and MENDELSON, R. (2009). Efficient pollution regulation: Getting the prices right. *American Economic Review*, **99** (5), 1714–1739.
- MARTIN, R., MUULS, M., DE PREUX, L. and WAGNER, U. (2014). Industry compensation under relocation risk: A firm-level analysis of the EU emissions trading scheme. *American Economic Review*, **104** (8), 2482–2508.
- *FOWLIE, M., REGUANT, M. and RYAN, S. (2016). Market-based emissions regulation and industry dynamics. *Journal of Political Economy*, **124** (1), 249–302.
- *—, —, — and ZARAGOZA-WATKINS, M. (2019). Expecting the unexpected: Emissions uncertainty and environmental market design. *American Economic Review*, **109** (11), 3953–3977.

7. Markets with constraints

- DALES, J. (1968). Land, water, and ownership. *The Canadian Journal of Economics / Revue canadienne d'Economique*, **1** (4), 791–804.
- — (1977). Is the price system or rationing more effective in getting a commodity to those who need it most? *Bell Journal of Economics*, **8**, 517–524.
- CHONG, H. and SUNDING, D. (2006). Water markets and trading. *Annual Review of Environment and Resources*, **31**, 239–264.
- *RAFEY, W. (2019). Droughts, deluges, and (river) diversions: Valuing market-based water reallocation, Job Market Paper, MIT Department of Economics.
- DONNA, J. and ESPIN-SÁNCHEZ, J. (2018). The illiquidity of water markets: Efficient institutions for water allocation in southeastern Spain. *Working Paper*.
- *AGARWAL, N., ASHLAGI, I., AZEVEDO, E., FEATHERSTONE, C. and KARADUMAN, O. (2019). Market failure in kidney exchange. *American Economic Review*, **109** (11), 4026–4070.
- *FRECHETTE, G., LIZZERI, A. and SALZ, T. (2019). Frictions in a competitive, regulated market: Evidence from taxis. *American Economic Review*, **109** (8), 2954–2992.

8. Externalities and missing markets

- *HODGSON, C. (2018). Information externalities, free riding, and optimal exploration in the UK oil industry. *Job Market Paper, Stanford University*.

- STAVINS, R. and JAFFE, A. (1990). Unintended impacts of public investments on private decisions: The depletion of forested wetlands. *American Economic Review*, **80** (3), 337–352.
- BURGESS, R., HANSEN, M., OLKEN, B., POTAPOV, P. and SIEBER, S. (2012). The political economy of deforestation in the tropics. *Quarterly Journal of Economics*, **127** (4), 1707–1754
- SOUZA-RODRIGUES, E. (2019). Deforestation in the Amazon: A unified framework for estimation and policy analysis. *Review of Economic Studies*, **86** (6), 2713–2744.
- *SCOTT, P. (2013). Dynamic discrete choice estimation of agricultural land use. *Working paper*, Princeton University.
- BAYER, P., McMILLAN, R., MURPHY, A. and TIMMINS, C. (2016). A dynamic model of demand for houses and neighborhoods. *Econometrica*, **84** (3), 893–942.
- *HSIAO, A. (2021). Coordination and commitment in international climate action: Evidence from palm oil. *Job Market Paper*, MIT.
- *HUANG, L. and SMITH, M. (2014). The dynamic efficiency costs of common-pool resource exploitation. *American Economic Review*, **104** (12), 4071–4103.