

Ph.D Strategy (2013)

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Overview

The objective of this course is to learn and practice the skills that help us link theory to data. The goal of much of empirical work is to test competing economic theories or to estimate and recover model primitives from data. In doing so, we have to think about how theory relates to actual data both formally and informally: What kind of variation in the data do we need in order to distinguish two competing economic theories? What kind of variation in the data drives the estimates of the model parameters? What are the key identifying assumptions that allow us to recover parameters? We want to think about these questions before we go ahead and write down a super complicated model and estimate it using maximum likelihood (or whatever your favorite estimator may be).

The course has three broad sections. First, we will look at the relationship between theory and data in a formal way. We will give a formal definition of identification and go through identification of general economic examples, such as binary threshold crossing models. I am going to cover only the basics in this class as this is not an econometric class and I am not an econometrician. The second part of the course will still retain the formal flavor, but we will examine identification of models that are more specific to industrial organization. Here, we will closely examine the balance between applicability (how reasonable are the data requirements? Do data sets that empirical researchers often work with satisfy the requirements? Required support conditions, e.g. identification at infinity?) and generality of the results/models. Topics include auctions, models of asymmetric information, bargaining, etc. We will cover a few topics to get a feel of the type of work that's done. Lastly, in our third part of the course will look at empirical papers and we will discuss identification issues in a more informal sense.

Course Activity

The first two sections of the class will be lecture style. The last section will involve student presentation and class discussion. I plan to give out a few problem sets. Grades will be based on class participation. I am happy to accommodate your preferences when we get to the topics section as well as choosing papers for class discussion.

Tentative Class Schedule:

1st and 2nd week: Formal definition of identification and general applications.

References

Imbens, G. W., and W. K. Newey (2009): "Identification and Estimation of Triangular Simultaneous Equations Models Without Additivity, *Econometrica*, 77(5)

C. Manski, *Identification Problems in the Social Sciences*, Harvard, 1995

C. Manski, *Partial Identification of Probability Distributions*, Springer-Verlag, 2003

*Matzkin, R.L. (1994) "Restrictions of Economic Theory in Nonparametric Methods," *Handbook of Econometrics*, Vol. 4, edited by C.F. Engel and D.L. McFadden, Elsevier

*Matzkin, R.L. (2007) "Nonparametric Identification," in *Handbook of Econometrics*, Vol. 6b, edited by J.J. Heckman and E.E. Leamer, Elsevier Science.

Matzkin, R.L. (1992) "Nonparametric and Distribution-Free Estimation of the Binary Choice and the Threshold Crossing Models", *Econometrica*, Vol. 60, No. 2.

Matzkin, R.L. (1991) "Semiparametric Estimation of Monotone and Concave Utility Functions for Polychotomous Choice Models," *Econometrica*, Vol. 59, No. 5, pp. 1315-1327.

Newey, W. K., and J. L. Powell (2003): "Instrumental Variable Estimation in Non-parametric Models," *Econometrica*, 71(5), 1565-1578

3rd to 5 (or 6th) week: Identification in specific economic models

Potential Topics: (According to the interests of the class)

1. Auction Models

References

Athey, Susan and Phil Haile, *Nonparametric Approaches to Auctions*, in J. Heckman and E. Leamer, eds., *Handbook of Econometrics*, Vol. 6A, Elsevier, 2007, ch. 60, pp. 3847-3965.

Athey, Susan and Phil Haile, *Identification of Standard Auction Models*, with, *Econometrica*, 70 (6), November 2002, 2107-2140.

Guerre, E., I. Perrigne and Q. Vuong (2000), "Optimal Nonparametric Estimation of First-Price Auctions," *Econometrica* 68:525 - 574.

Hendricks, K. and R. Porter (forthcoming), "Lectures on Auctions: An Empirical Perspective," in M. Armstrong and R. Porter, eds, *Handbook of Industrial Organization*, vol III, Elsevier.

Hendricks, K., J. Pinkse and R. Porter (2003), "Empirical Implications of Equilibrium Bidding in First-Price, Symmetric, Common Value Auctions," *Review of Economic Studies* 70:115—145.

Haile, P. and E. Tamer (2003), "Inference with an Incomplete Model of English Auctions," *Journal of Political Economy* 111:1 - 52.

Laffont, J., H. Ossard and Q. Vuong (1995), "Econometrics of First-Price Auctions," *Econometrica* 63:953—980.

2. Adverse Selection/Moral Hazard

Chiappori, P.A. and B. Salanié (2000): "Testing for Asymmetric Information in Insurance Markets," *Journal of Political Economy*, 108, 56-78.

D'Haultfoeuille, X. and P. Février (2007): "Identification and Estimation of Incentive Problems: Adverse Selection," Working Paper, CREST-INSEE.

Gayle, G.L. and R. Miller (2008): "Identifying and Testing Generalized Moral Hazard Models of Managerial Compensation," Working Paper, Carnegie Mellon University.

Kawai, K., K. Onishi, U. Kosuke (2012), "Signaling in Online Credit Markets"

Perrigne, I. and Q. Vuong, "Nonparametric Identification of a Contract Model with Adverse Selection and Moral Hazard," (forthcoming *Econometrica*)

3. Bargaining

References

da Silveira, B. (2012) "Bargaining with Asymmetric Information: an Empirical Study of Plea Negotiations"

Merlo, A. and X. Tang, "Identification and Estimation of Stochastic Sequential Bargaining Games," *Econometrica*, Vol 80, Issue 4, 2012

Iaryczower, Matias., Xiaoxia Shi, and Matt Shum (2012): "Words Get in the Way? Partial Identification of a Strategic Deliberation Model"

4. Entry (and Multiple Equilibria)

References

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

Beresteanu, A., I. Molchanov, and F. Molinari (2011). Sharp identification regions in models with convex moment predictions. *Econometrica* 79 (6), 1785 - 1821.

Ciliberto, F. and E. Tamer (2009). Market structure and multiple equilibria in airline markets. *Econometrica* 77 (6), 1791-1828.

Greico, P. (2012) "Discrete Games with Flexible Information Structures: An Application to Local Grocery Markets"

Sweeting, A. (2009). The strategic timing of radio commercials: An empirical analysis using multiple equilibria. *RAND Journal of Economics* 40 (4), 710 - 742.

Tamer, E. (2003). Incomplete simultaneous discrete response model with multiple equilibria. *Review of Economic Studies*, 147-165.

5. Demand Systems

References

Berry, S., and P. Haile, "Identification in a Class of Nonparametric Simultaneous Equations Models"

Berry, S., and P. Haile "Identification in Differentiated Products Markets Using Market Level Data"

Berry, S., P. Haile and A. Gandhi, (2012) "Connected Substitutes and Invertibility of Demand"

6. Dynamic Games, Dynamic Decision Problems

References

P Bajari, CL Benkard, J Levin: "Estimating dynamic models of imperfect competition"
Econometrica, 2007

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

V. Joseph Hotz; Robert A. Miller; Seth Sanders; Jeffrey Smith: "A Simulation Estimator for Dynamic Models of Discrete Choice," *The Review of Economic Studies*, Vol. 61, No. 2. (Apr., 1994), pp. 265-289.

Magnac, T. and Thesmar, D. (2002), "Identifying Dynamic Discrete Decision Processes." *Econometrica*, 70: 801–816

G. Steven Olley; Ariel Pakes. "The dynamics of productivity in the telecommunications equipment industry," *Econometrica*, Volume 64, Issue 6 (Nov., 1996),

Chaim Fershtman and Ariel Pakes "Dynamic Games with Asymmetric Information: A Framework for Empirical Work" *The Quarterly Journal of Economics* (2012)

7. Matching, Coalition Formation

References

Fox, J. "Identification in Matching Games" QE 2010

Fox, J. "Estimating Matching Games with Transfers"

Sorensen, M. (2007). "How Smart Is Smart Money? A Two-Sided Matching Model of Venture Capital." *Journal of Finance* 62 (6), 2725 - 2762.

Uetake, K. and Y. Watanabe (2012). "Entry by Merger: Estimates from a Two-Sided Matching Model with Externalities."

Weese, E. (2008). "Political Mergers as Coalition Formation: Evidence from Japanese Municipal Amalgamations."

8. Quantal Response

References

Philip A. Haile & Ali Hortacsu & Grigory Kosenok, "On the Empirical Content of Quantal Response Equilibrium," *American Economic Review*, vol. 98(1), pages 180-200,

9. Supermodular Games

References

Jia, P. (2008, November). What happens when wal-mart comes to town: An empirical analysis of the discount retailing industry. *Econometrica* 76 (6), 1263 - 1316.

Uetake, K. and Y. Watanabe "A Note on Estimation of Supermodular Games"

10. Social Interactions

References

Brock, W. A., and S. N. Durlauf (2001): "Discrete choice with social interactions," *The Review of Economic Studies*, 68(2), 235–260.

Brock, W. A., and S. N. Durlauf (2007): "Identification of binary choice models with social interactions," *Journal of Econometrics*, 140(1),

de Paula, Á., and X. Tang (2012): "Inference of signs of interaction effects in simultaneous games with incomplete information," *Econometrica*, 80(1), 143–172.

Manski, C.F. (1993): "Identification of endogenous social effects: the reflection problem," *Review of Economic Studies*, 60(3), 531–42.