Graduate Economics Module 881-07 **Andrew Sweeting**
Soc Sci 111, Fall 2012, Aug 28-Oct 9

DEMAND MODELS

This course focuses on the estimation and application of models of demand. These models are the foundation of most applied structural work in Industrial Organization, Marketing, urban, trade, health and political economy. We will cover both technical details (specification, estimation, identification and interpretation) and applications. We will not cover hedonic methods that are covered extensively in other modules.

Problem Sets and Exams: your grade will be determined by weekly empirical problem sets, class presentations/participation and a short exam on October 9. The exam – based on a paper to be distributed - will be straightforward if you work hard.

The problem sets are vital for understanding what is going on, not an optional extra. You should be ready to talk about the results in class. I am happy for you to work in small groups of two or three people, but each student must submit their own write-up of the results. The empirical work can be done in STATA and/or MATLAB, but feel free to use other languages if you are more familiar with them.

Reading List: there are two types of readings: ones that you should be done prior to class and ones that we will discuss in class and you may want to look at afterwards. Make suggestions if you find other papers you like and I may well add papers as we go along.

There is no required textbook. However, there are some useful books:

For background on theoretical IO:
Paul Belleflamme and Martin Peitz, *Industrial Organization: Markets and Strategies*, Cambridge University Press, 2010 (on 3 hour reserve in the library)
Jean Tirole, *The Theory of Industrial Organization*, MIT, 1987 (a must-have if you want to do IO research)

For background on empirical issues:
Peter Davis and Eliana Garces, *Quantitative Techniques for Competition and Anti-trust Analysis*, Princeton, 2010 (available on Sakai)
Greene, *Econometric Analysis* or Wooldridge, *Econometric Analysis of Cross-Section and Panel Data*

WEEK 1, AUG 28: INTRODUCTION AND STATIC DEMAND FOR HOMOGENOUS GOODS

We will discuss:

- basic econometric issues in demand estimation (e.g., endogeneity)
- estimation of (static) demand for homogenous products
- applications of this method to the measurement of market power
- estimation of demand with individual data (time permitting)

The first problem set will get you to apply these methods using 2SLS and a GMM estimator.

Pre-lecture reading:

Davis and Garces, Chapter 9.1, 6.2

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

Lecture-related reading:

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.

LECTURE 2, SEPT 4: STATIC DEMAND FOR DIFFERENTIATED PRODUCTS

We will discuss:

- two common alternative specifications for estimating differentiated product demand (multi-stage budgeting and logit-based models) with many products
- estimation of logit-based models (in detail)
- methods for addressing endogeneity
- interaction with the supply-side;
- identification (not in detail); and,
- calculation of welfare.

The second problem set, which will take two weeks, will get you to work through estimation code for the BLP model. In particular you will see some of the pitfalls in how things are often done.

Pre-lecture reading:

Davis and Garcia

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

Lecture-related reading:

S. Anderson, A. dePalma and J. Thisse (1992), *Discrete Choice Theory of Product Differentiation*, 1992, Cambridge and London, MIT Press.

T. Bresnahan (1982), "Competition and Collusion in the American Automobile Market: The 1955 Price War", Journal of Industrial Economics, June 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.

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

P. Goldberg, "Product Differentiation and Oligopoly in International Markets: The Case of the U.S. Automobile Industry", Econometrica, July 1995, 891-951

Welfare (and Instruments)

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 reply to comment (and reply to reply).

M. Trajtenberg, “The Welfare Analysis of Product Innovations, with an Application to Computed Tomography Scanners,” JPE 1999, 444-79.

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

A. Nevo, “New Products, Quality Changes and Welfare Measures Computed from Estimated Demand Systems,” ReStat, 2003, 85(2), 266-275.

D. Ackerberg and M. Rysman., “Unobservable Product Differentiation in Discrete Choice Models: Estimating Price Elasticities and Welfare Effects,” RAND, Winter 2005, 771-788.

Implementation and Problems (also discussed in Lecture 4)

A. Nevo, “A Practitioner’s Guide to Estimation of Random Coefficients Logit Models of Demand”, JEMS, 2000, 513-548.

L. Chiou and J. Walker (2007), “Masking identification of discrete choice models under simulation methods”, Journal of Econometrics, 141(2), 683-703

K Train (2009), *Discrete Choice Methods with Simulation*, Cambridge University Press
available: http://elsa.berkeley.edu/books/choice2.html

C Knittel and K Metaxoglou (2011), “In Search of the Truth: Merger Simulations Using Random Coefficient Logit Models”
http://www.econ.ucdavis.edu/faculty/knittel/papers/mergers_latest.pdf

J-P Dube, J Fox and C-L Su (2011), **“**Improving the Numerical Performance of BLP Static and Dynamic Discrete Choice Random Coefficients Demand Estimation”, mimeo
http://www-personal.umich.edu/~jtfox/working-papers/dube_fox_su_web.pdf

LECTURE 3, SEPT 11: APPLICATIONS, APPLICATIONS, APPLICATIONS …

In this lecture we are going to discuss several applications from across applied micro. You are going to do presentations, while I will provide background (especially for the IO applications).

Your presentations should be 30 minutes long. Be clear on the economics being considered, and how estimation of demand allows the question to be answered. Where the specification or method has been discussed in class you do not need to go through it again. You should provide your slides to the rest of the class.

You can choose from the following or make suggestions:

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

S. Berry and P. Jia (2010), "Tracing the Woes: An Empirical Analysis of the Airline Industry", American Economic Journal: Microeconomics 2 (August 2010): 1–43
http://www.aeaweb.org/articles.php?doi=10.1257/mic.2.3.1 (IO)

A. Starc (2010), "Insurer Pricing and Consumer Welfare: Evidence from Medigap", mimeo (IO/Health/Marketing)
http://www.people.fas.harvard.edu/~astarc/astarc_jmp.pdf

R Brenkers and F Verboven (2006), "Liberalizing a Distribution System: The European Car Market", Journal of the European Economic Association, 4(1), 216-251 (IO/Trade)
http://www.jstor.org/stable/40004956

J Hastings, T Kane and D Staiger (2008), "Heterogeneous Preferences and the Efficacy of Public School Choice", mimeo (Education)
http://www.econ.brown.edu/faculty/Justine_Hastings/papers/HKS_Combined_200806.pdf

C Chu, A Sorensen and P Leslie (2011), "Bundle-Size Pricing as an Approximation to Mixed Bundling", AER, 101(1), 263-303

B McManus (2007), "Nonlinear Pricing in an Oligopoly Market: The Case of Specialty Coffee", RAND, 38(2), 512-532

LECTURE 4, SEPT 18: ALTERNATIVE APPROACHES TO ESTIMATING DEMAND FOR STATIC MODELS

In this lecture we will discuss

- some problems with standard estimation techniques for BLP models;
- estimation using micro and macro data
- specification and estimation of models that take a different approach to the idiosyncratic error terms.

C Knittel and K Metaxoglou (2011), "In Search of the Truth: Merger Simulations Using Random Coefficient Logit Models"
http://www.econ.ucdavis.edu/faculty/knittel/papers/mergers_latest.pdf

JP Dube, J Fox, C-L Su. "Improving the Numerical Performance of BLP Static and Dynamic Discrete Choice Random Coefficients Demand Estimation", forthcoming Econometrica

Integration of Micro and Aggregate Data

S. Berry, J. Levinsohn and A. Pakes, "Differentiated Products Demand Systems from a Combination of Micro and Macro Data: The New Car Market," JPE, 2004, 68-105.

Pure Characteristics Demand Model

Ariel Pakes and S. Berry (2007), "The Pure Characteristics Demand Model", International Economic Review, 48(4)
http://onlinelibrary.wiley.com/doi/10.1111/j.1468-2354.2007.00459.x/pdf

M. Song (2007), "Measuring Consumer Welfare in the CPU Market: An Application of the Pure Characteristics Demand Model", RAND, 38(2), 429-446

Moment Inequalities

A Pakes (2010) "Alternative Models for Moment Inequalities"
http://www.economics.harvard.edu/faculty/pakes/files/FS3.pdf

K Ho and A Pakes (2011) "Physician Responses to Financial Incentives: Evidence from Hospital Discharge Data", mimeo (IO/Health)

K Kawai and Y Watanabe, "Inferring Strategic Voting", mimeo
some slides: http://cowles.econ.yale.edu/conferences/2011/sum11/str_kei.pdf (Political Economy)

LECTURE 5, SEPT 25: DYNAMIC DEMAND MODELS

This lecture will introduce dynamic demand models. We will consider the specification, solution and estimation of dynamic models for durable and storable goods.

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

I Hendel and A. Nevo (2006), "Sales and consumer inventory". RAND, 37(3):543-561

G. Gowrisankaran and M. Rysman (2009), "Dynamics of consumer demand for new durable goods", mimeo
http://www.u.arizona.edu/~gowrisan/pdf_papers/dynamicdemand.pdf

LECTURE 6, OCT 2: APPLICATIONS OF DYNAMIC DEMAND MODELS
(note: Chris Adams from the FTC is visiting and he may talk to our class)

In the final lecture, students will present applications of dynamic demand models. We will also discuss models of consumer learning that provide an alternative source of market dynamics.

Papers for Presentation

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

C Conlon (2010), "A Dynamic Model of Costs and Margins in the LCD TV Industry", mimeo (hopefully a new version will be available)
http://faculty.chicagobooth.edu/workshops/marketing/archive/pdf/conlonjmp2010nov.pdf

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

J Lazarev (2012), "The Welfare Effects of Intertemporal Price Discrimination", Stanford University

Learning

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

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

LECTURE 7, OCT 9: SHORT EXAM