Estimation of 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:** there will be weekly empirical problem sets which will determine your grade for the course, together with a short exam (which will be straightforward if you have worked 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. You will also be expected to present at least one applied paper, and participate actively in class.

**Reading List:** there are two types of readings: ones that you should do prior to class and ones that we will discuss in class (or are related to what we 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. (%) denotes topics that we may not discuss given time constraints.

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


For background on empirical issues: Peter Davis and Eliana Garces, *Quantitative Techniques for Competition and Anti-trust Analysis*, Princeton, 2010 (on 3 hour reserve in the library) which is aimed at a mixed academic/antitrust economist audience. It is particularly good for the topics at the start of the course. You will also want to consult an econometrics textbook on a regular basis: I would recommend either Greene or the Wooldridge *Econometric Analysis of Cross-Section and Panel Data* textbook.
WEEK 1, SEP 2: INTRODUCTION AND STATIC DEMAND FOR HOMOGENEOUS 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 (%)

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


Lecture-related reading:

T. Bresnahan, “The Oligopoly Solution is Identified”, Economics Letters, 1980, 10, 87-92 (the following paper by Lau is also relevant)


G. Ellison, “Theories of Cartel Stability and the Joint Executive Committee”, RJE, Spring 1994, 37-57 (follow up to the Porter paper)


LECTURE 2, SEPT 9: 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 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


Lecture-related reading:


Welfare (and Instruments)


Implementation and Problems (also discussed in Lecture 4)


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.

The third problem set will get you to use demand estimates and firms’ pricing equations to predict the effects of a merger.

You can choose from the following or make suggestions:


P Bayer, R McMillan and K Reuben, “An Equilibrium Model of Sorting In an Urban Housing Market”, mimeo (Urban)
LECTURE 4, SEPT 23: 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.

The fourth problem set (a direct follow on from the third problem set) will get you to address some of the issues raised by the Knittel and Metaxoglou (2011) paper.


Integration of Micro and Aggregate Data


Pure Characteristics Demand Model


Moment Inequalities


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
LECTURE 5, SEPT 30: 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.

The fifth problem set will get you to solve a discrete-state model of a storable good problem (similar to Hendel and Nevo, 2006) and to illustrate the biases when a static demand model is estimated using data generated from your model.


http://www.u.arizona.edu/~gowrisan/pdf_papers/dynamicdemand.pdf

LECTURE 6, SEPT 7: APPLICATIONS OF DYNAMIC DEMAND MODELS

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


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


Learning


LECTURE 7, OCT 14: SHORT EXAM

The exam will have two sections. The first section will contain several questions about empirical methods discussed in the course (e.g., asking you how to estimate a particular model, how you would choose valid instruments etc.). The second section will contain more detailed questions about an empirical paper distributed in Lecture 6.