

# Graduate Industrial Organisation II

G31.1802.001/B30.3360.001

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## Overview

This is the second course in the Graduate Industrial Organization sequence. The goal is to familiarize students with selected theoretical and empirical topics in industrial organization and help students start their own research agendas. The focus of the course will be on more “classical” IO topics than those covered in the first semester: we will cover static oligopoly models in considerable depth both theoretically and empirically and a few other topics that grow naturally from this broad area of investigation.

## Course Requirements

1. Participation: where the syllabus lists a paper with a star next to it, this indicates reading is required before class. This paper will be discussed in class and an inability to discuss the paper will reflect badly on you and, more importantly, you won't get much from the class.
2. Problem Sets: a few problem sets will be given
3. Exam: an exam will be given that covers selected topics (we will be clear about what is covered and what is not).
4. Research Proposal: In 6 months you will be starting dissertation research, now is the right time to start mulling over ideas. To encourage you to do this we will require a research proposal of around 5 pages. Use this to look for topics that excite you for your dissertation.

Relevant documents for the course and other announcements are going to be posted on Blackboard. Please, check the Blackboard page of the course regularly.

## Books

Tirole's "*The Theory of Industrial Organization*" is a required text. If you haven't got it already, buy it. It is an invaluable reference.

Many other books are useful generally for IO economists and may be referred to from time-to-time. These include:

John Sutton, "*Technology and Market Structure*"

Oz Shy, "*Industrial Organization*" [an undergraduate version of Tirole that is useful when you want to see the simplest possible version of a model - good bedtime reading]

Andersen, de Palma and Thisse, "*Discrete Choice Theory of Product Differentiation*" [a very useful companion to the section on demand estimation that provides all the conceptual underpinnings of the models used to think about product differentiation]

Robert Wilson, "*Nonlinear Pricing*"

The syllabus from semester 1 lists several others that are often useful.

## Course Structure

The course will be a mixture of theory and empirics. The theory components will be taught by Mariagiovanna Baccara and the empirical bits by John Asker. The course will jump from one to the other so that, loosely speaking, the empirical sections will complement the theory sections and vice versa.

## The Theory Component

Starting from the 1970s, an increasing number of theorists have been becoming interested in Industrial Organization. This is because noncooperative game theory became the standard tool to analyze strategic conflicts and it lent itself naturally to the analysis of industrial organization topics (while until then the tools of general equilibrium analysis were not ideal to tackle the same issues).

The theoretical component of this course aims to give you a concise but solid background of the classical results in IO theory, and then to highlight some very recent contributions to the same literature. We will give a particular attention to the topics that are more complementary to the empirical part of the course.

Since IO theory has become increasingly formal in the last years, familiarity with the game theoretical tools covered in the first year Micro sequence is essential. In particular circumstances, I might cover a specific tool useful for some results myself. The best reference for game theoretical tools is the book "*A Course in Game Theory*" by M.Osborne and A.Rubinstein (1994) ("*Game*

*Theory*” by D.Fudenberg and J.Tirole is also good).

To avoid wasting time going over the most basic materials, you should at least have read the relevant parts of the Tirole book before class. However, it is also a good idea if you start reading the papers beforehand.

## **The Empirical Component**

The empirical component of the course aims to prepare you as both a producer and consumer of empirical work in IO. The last 15 years has seen a resurgence in empirical work in IO. A large amount of work in IO is now empirical, often combining sophisticated econometrics with serious theory. Even as a theorist interested in IO it is important to be able to be an informed consumer of empirical work.

The empirical component will do two things: first it will provide a coverage of demand estimation. Demand systems often provide the bedrock of empirical IO work and understanding how to deal with the problems that arise in dealing with estimation of demand from micro-econometric data sets is a core skill for the applied IO economist (it is also useful for public finance and other applied micro areas). We will spend about three lectures on this area and its applications.

Second we will look at several different topics from an empirical point of view, after we have dealt with the theory. These classes will be run as a reading group. It is a waste of time to turn up to these classes if you have not done the assigned reading. When doing the assigned reading try to make sure you can understand the following questions about the paper:

1. What is the research question?
  - How does the research question relate to existing theoretical and empirical literature?
  - Why is it worth asking?
2. What is are the data being used here?
  - How was it collected?
  - What are the important variables?
  - How are they defined?
  - What is the unit of observation?
3. What is the empirical strategy for answering this research question?
  - If you had an ideal data set, what would it look like? What empirical strategy would you use on it?

- How is the data set in this paper different from that ideal data set?
  - How does identification work in this paper?
  - What are the sources of exogenous variation?
  - How much of the identification is coming from the model and how much from the data?
4. What econometric techniques are being used in this paper?
- Are they appropriate?
  - What is the central estimating equation (or equations)?
  - What is in the unobservable component?
  - What are the instruments being used? Do you think they are valid?
  - How does the econometric model relate to the theoretical framework?
5. What are the main results of the paper?
- What are the economic implications of the results?
6. What do we learn from this paper?
7. What questions does this paper leave unanswered? How might you answer them?

## 1 Outline and selected reading

An asterisk next to a paper means it is required reading before class

*Warning for the theory parts:* This list includes the papers we will focus on in class, plus some we will briefly refer to. It is far from being an exhaustive account of all the relevant IO literature on each given topics. For a more complete list of the classics, simply refer to the bibliography at the end of each chapter of the Tirole book.

### **Class 1: Introduction, Simple industry models and Demand Pt 1 (MB & JA)**

Class Notes (TBD)

Berry (1994) Estimating Discrete Choice Models of Product Differentiation, RAND 25(2) 242-262

Berry, Levinsohn and Pakes (1995) Automobile Prices in Market Equilibrium Econometrica 63(4) 841-90 [although the NBER working paper version is a much more pleasant read]

Bresnahan (1987) Competition and Collusion in the American Automobile Industry: The 1955 Price War, J.I.E. 35(4) 457-482

Deaton and Muellbauer (1980) An Almost Ideal Demand System AER

Gentzkow (2005) Valuing new goods in a model with complementarities: online newspapers, mimeo, Chicago GSB

Hayashi (2000) Econometrics PUP [Ch3 has a nice discussion of the standard endogeneity problems in demand estimation in a GMM framework]

Hausman, Leonard & Zona (1994) Competitive Analysis with Differentiated Products, Annales d'Econ. et Stat.

Nevo (2001) Measuring Market Power in the Ready-to-Eat Cereal Industry, Econometrica 69(2) 307-322

Nevo (1998) A Research Assistants Guide to Random Coefficient Discrete Choice Models of Demand NBER Technical Working Paper T0221

Petrin (2002) Quantifying the Benefits of New Products: The Case of the Minivan, JPE 110(4) 705-29.

Working (1927) What do Statistical Demand Curves Show? QJE 41 212-35

## **Class 2: Demand Pt 2 (JA)**

As for class 1

## **Class 3: Demand Pt 3 (JA)**

As for class 1

## **Class 4: Monopoly Theory (MB)**

### **Price Discrimination and Non-Linear Pricing** \*Tirole, Chapters 2,3

Wilson, Chapters 4,9,11,12

\*Mussa and Rosen (1978) "Monopoly and Product Quality", JET, 18, 301-317

\*Maskin and Riley (1984) "Monopoly with Incomplete Information" Rand 15, 171-196

Oren, Smith and Wilson (1980), "Optimal Non-Linear Pricing for Quantity and Quality", ARG Technical Report 80-17.

Oren, Smith and Wilson (1982), "Competitive Non-Linear Tariffs", JET 29: 49-71

Oren, Smith and Wilson (1985), "Capacity Pricing", EMA 53, 545-566

Rochet and Chone (1998) "Ironing, Sweeping and Multidimensional Screening", EMA 66(4) 783-826

**Dynamic Monopoly** Bulow (1982) “Durable Good Monopolist”, JPE 90:314-352

Bulow (1986) “An Economic Theory of Planned Obsolescence”, QJE 101 729-749

\*Gul, Sonnenschein and Wilson (1986) “Foundation of Dynamic Monopoly and the Coase Conjecture”, JET 39 155-190

\*Gul and Sonnenschein (1988) “On Delay in Bargaining with One-Sided Uncertainty”, EMA 56 601-612

\*Milgrom and Roberts (1986) “Pricing and Advertising Signals of Product Quality”, JPE 94 796-821

\*Bagwell and Riordan (1991) “High and Declining Prices Signal Product Quality”, AER, 81 224-239

\*Pesendorfer (1995) “Design Innovation and Fashion Cycles”, AER 85(4) 771-792

Bergemann and Valimaki (2004) "Monopoly Pricing of Experience Goods", Mimeo

Dudine, Lizzeri and Hendel (2004) “The Storable Good Monopolist”, Mimeo

## **Class 5: Empirical Models of Price Discrimination (JA)**

\*Leslie (2002) Price Discrimination in Broadway Theatre, forthcoming in RAND, available on Phillip Leslie’s website at Stanford GSB.

\*Goldberg (1996) Dealer Price Discrimination in New Car Purchases: Evidence from the CES, JPE 104(3) 622-54.

Borenstein and Rose (1994) Competition and Price Dispersion in the US Airline Industry, JPE 653-683

Miravete and Roeller (2003) Competitive Nonlinear Pricing in Duopoly Equilibrium: The Early US Cellular Telephone Industry, CEPR Discussion Paper 4069. (on Eugenio Miravete’s web site at UPenn)

Shepard (1991) Price Discrimination and Retail Configuration, JPE 99(1), 30-51

## **Class 6: Oligopoly (MB)**

**Homogeneous Product** \*Tirole, Chapter 5

\*Shapiro, C., "Theories of Oligopoly Behavior, "Chapter 6 in Handbook of Industrial Organization, Volume I, pp. 329-414.

\*Kreps, D., and Scheinkman, J. (1983) "Quantity Pre-commitment and Bertrand Competition Yield Cournot Outcomes," Bell Journal of Economics 326-337

Maggi (1996) “Strategic trade policies with endogenous mode of competition” AER 86(1), 237-58, March 1996.

## **Product Differentiation** \*Tirole, Chapter 7

Hotelling, H., "Stability in Competition," *Economic Journal*, (1929), pp. 41-57.

D'Aspremont, Gabszewicz, C.J., and Thisse, J. (1979), "On Hotelling's Stability in Competition," *Econometrica*, 47 1145-50.

Salop, S. (1979), "Monopolistic Competition with Outside Goods," *Bell Journal of Economics*, 10, 141-156.

\*Shaked, A., and Sutton, J. (1982), "Relaxing Price Competition Through Product Differentiation," *Review of Economic Studies*, 49 3-13.

Shaked, A., and Sutton, J (1983), "Natural Oligopolies," *EMA* 51, pp. 1469-84.

Shaked, A., and Sutton, J.(1987), "Product Differentiation and Industrial Structure," *Journal of Industrial Economics*, 36, pp. 131-146.

Roberts, J., and Sonnenschein, R. (1977), "On the Foundation of the Theory of Monopolistic Competition," *EMA*, pp. 101-13.

Spence, M. (1976), "Product Selection, Fixed Costs and Monopolistic Competition," *RES* 43, pp. 217-35.

Spence, M. (1976), "Product Differentiation and Welfare," *AER* 66, pp. 407-14.

Dixit, A. and Stiglitz, J. (1977), "Monopolistic Competition and Optimum Product Diversity," *AER*, 297-308.

Hart, O. (1985), "Monopolistic Competition in the spirit of Chamberlin: A General model," *RES* 52, pp. 529-546.

Perloff, J., and Salop, S. (1985), "Equilibrium with Product Differentiation," *RES*, 52, pp. 107-20.

## **Class 7: Collusion (MB)**

\* Tirole, Chapter 6

\* Abreu, D. (1988), "On the Theory of Infinitely Repeated Games with Discounting," *EMA* 56, 383-396.

\* Abreu, D., Pearce, D., and Stachetti, (1986) E., "Optimal Cartel Equilibria with Imperfect Monitoring," *JET* 39, 251-269.

\* Green, E., and Porter, R. (1984), "Noncooperative Collusion Under Imperfect Price Information," *EMA* 52, 87-100.

Bernheim, D., and Whinston, M. (1990), "Multimarket Contact and Collusive Behavior," *Rand Journal of Economics*, 21, 1-26.

Staiger and Wolak, F. (1992), "Collusive Pricing and Capacity Constraints in the presence of

Demand Uncertainty," *Rand Journal of Economics* 23, 203-220.

\*Athey and Bagwell (2001) "Optimal Collusion with Private Information", *Rand*, 428-465

\*Athey, Bagwell and Sanchirico (2004) "Collusion and Price Rigidity", *RES* 317-349

### **Class 8: Entry and Exit (MB)**

Tirole, Chapter 8

\*Aghion, P. and Bolton, P. (1987), "Contracts as a Barrier to Entry," *AER*, 77, pp. 388-401.

\*Bulow, Geneakoplos and Klemperer (1985) "Multimarket Oligopoly: Strategic Substitutes and Complements", *JPE* 93: 488-511

Fudenberg and Tirole "The Fat Cat Effect, the Puppy Dog Ploy and the Lean and Hungry Look", *AER Papers and Proceedings* 74 361-368

Bernheim, D. (1984), "Strategic Deterrence of Sequential Entry into an Industry," *Rand*, 15, pp. 1-11

Salop, S. and Scheffman, D. (1983), "Raising Rival's Costs," *American Economic Review* Papers and Proceedings, 73, 267-271

Spence, A.M., "The Learning Curve and Competition," *Bell Journal of Economics* (12), Spring 1981, pp. 49-70.

Fudenberg, D. and Tirole, J., "Learning by Doing and Market Performance," *Bell Journal of Economics* (14), Autumn 1983, pp. 522-530.

\* Cabral, L. and Riordan, M., "The Learning Curve, Market Dominance, and Predatory Pricing," *EMA* 62, 1115-1140

Bergemann and Valimaki (2002) "Entry and Vertical Differentiation", *JET* 106: 91-125

### **Class 9: R&D Theory (MB)**

\* Tirole, Chapter 9

Loury, G. (1979), "Market Structure and Innovation," *QJE*, 93 395-410

Lee, T. and L. Wilde (1980), "Market Structure and Innovation: A Reformulation," *QJE* 94, 429-436.

\* Chari, V.V. and Hopenhyn, H. (1991), "Vintage Human Capital, Growth and the Diffusion of New Technology," *JPE* 99, 1142-1165

\* Jovanovic, B. (1982), "Selection and the Evolution of Industry," *EMA*, 50, pp. 649-670.

Baccara and Razin (2003) "From Thought to Practice: Appropriation and Endogenous Market Structure with Imperfect Intellectual Property Rights", *Mimeo*

Hopenhayn and Squintani (2004) "Preemption Games with Private Information" *Mimeo*

### **Class 10: R&D related empirics (JA)**

\*Landjow (1998) Patent Protection in the Shadow of Infringement: Simulation Estimations of Patent-Value, *ReStud* 65(4), 671-710.

\*Tucker (2004) Network Effects and the Role of Influence in Technology Adoption, mimeo, Stanford GSB [available on Catherine's web site]

Adams and Jaffe (1996) Bounding the effects of R&D: An Investigation Using Matched Establishment-Firm Data *RAND* 27(4) 700-21

Pakes (1986) Patents as Options: Some Estimates of the Value of Holding European Patent Stocks, *Econometrica*, 54(4) 755-784

### **Class 11: Vertical Contracting and Integration (MB)**

\*Tirole, Chapter 4

Spengler (1950) "Vertical Integration and Anti-trust Policy", *JPE* 58, 347-352

\*Rey and Tirole (1986) "The Logic of Vertical Restraints", *AER*, 76, 921-939

O'Brien and Shaffer (1992) "Vertical Control with Bilateral Contracts", *Rand*, 23 (3), 299-308

Comanor and Frech (1985) "The Competitive Effects of Vertical Agreements", *AER* 75, 539-546

Salop and Scheffman (1983) "Rising Rivals Cost", *AER*, 73(2), 267-271

Schwartz (1987) "The Competitive Effects of Vertical Agreements: Comment", *AER*, 77, 1063-1068

Mathewson and Winter (1987) "The Competitive Effects of Vertical Agreements: Comment", *AER*, 77, 1057-1062

Rasmusen, Ramseyer and Wiley (1991) "Naked Exclusion", *AER* 81(5), 1137-1145

\*Bernheim and Whinston (1998) "Exclusive Dealing", *JPE*, 106(1), 64-103

Prat and Rustichini (2003) "Games Played Through Agents", *EMA*, 71(4), 989-1026

### **Class 12: Empirics of Contracting and Integration (JA)**

\*Akerberg and Botticini (1999) Endogenous Matching and the Empirical Determinants of Contractual Form, *JPE* forthcoming.

\*Gilbert and Hastings, Vertical Integration in Gasoline Supply: An Empirical Test of Raising Rivals' Costs, University of California Energy Institute Power Working Paper, No. PWP-084

\*Mortimer (2001) "Vertical Contracts in the Video Rental Industry", mimeo, Harvard University

Asker (2004), Diagnosing Foreclosure from Exclusive Dealing, mimeo NYU Stern

Slade (1996) Multitask Agency and Contract Choice: An Empirical Assessment, *Int. Econ.*

Review, 465-86

Chipty (2001) Vertical Integration, Market Foreclosure and Consumer Welfare, AER 91(3) 428-453

Villas-Boas (2002) Vertical Contracts Between Manufacturers and Retailers: An Empirical Analysis, CUDARE Working Paper 943 (Available on Sophia's web site at Berkeley)

Brenkers and Verboven (2002) Liberalising a Distribution System: the European Car Market, mimeo, K.U. Leuven.

### **Class 13: Theory of the firm (MB)**

\*Tirole, Chapter 1

Klein B., R.Crawford and A.Alchian (1978), "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process", Journal of Law and Economics, 21(2), 297-326

\*Grossman and Hart (1986), "The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration", JPE 94

\*Hart and Moore (1990), "Property Rights and the Nature of the Firm", JPE, 98(6), 1119-1158

\*Holmstrom and Milgrom (1994) "The Firm as an Incentive System", AER 84, 972-991

### **Class 14: Empirical work on the boundaries of the firm (JA)**

\*Baker and Hubbard (2003), Make vs Buy in Trucking: Asset Ownership, Job Design and Information, AER 551-572

\*Garicano and Hubbard (2003) Specialization, Firms, and Markets: The Division of Labor Within and Between Law Firms, Mimeo Chicago GSB