

Topics in Industrial Organization (Theory)

Fall 2014 (ECON-GA.3001.12 / ECON-GB.3360.01)

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(Thursday 3:30-6:30pm; Tisch UC-09)

1 Overview

This is a course in the Graduate Industrial Organization sequence, with a focus on theoretical topics. It has been designed to be a complement to the other IO courses being taught at NYU. The goal is to familiarize students with selected theoretical topics in industrial organization, and to help students prepare for studying empirical IO and start their own research agendas. The topics may be of interest to graduate students in other programs like marketing and management as well.

1.1 Textbook and background reading

You are expected to be familiar with the basic micro-theory and game theory.

- J. Tirole's "*The Theory of Industrial Organization*" is a required text.
- Other useful background reading:
 - *Handbook of Industrial Organization (Vol. I-III)*
 - F. Scherer and D. Ross's "*Industrial Market Structure and Economic Performance*"
 - L. Cabral's "*Introduction to Industrial Organization*"
 - P. Belleflamme and M. Peitz's "*Industrial Organization: Markets and Strategies*"
 - J. Sutton's "*Sunk Costs and Market Structure*", and "*Technology and Market Structure*"
 - M. Motta's "*Competition Policy: Theory and Practice*"
 - M. Whinston's "*Lectures on Antitrust Economics*"

1.2 Course requirements

- *Class 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.
- *Problem sets*: 3-4 problem sets will be given in due course.

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- *Class presentation*: each student will be asked to present one paper chosen from the list in section 4. Each presentation will last 30-40 minutes. Please choose a paper in the first two weeks and send an email to me and our TA Sonia Gilbukh (sophia.gilbukh@gmail.com).
- *Research proposal*: to encourage you to think of research ideas, you will be required to submit a research proposal of around 5 pages. Use this to look for topics that excite you for your dissertation.

1.3 Outline of topics by week

Lecture #	Dates	Topics
1	Sept 4	Basic monopoly and competition
2	Sept 11	Search I
3	Sept 18	Search II
	Sept 25	<i>No Class</i>
4	Oct 2	Price discrimination and bundling I
5	Oct 9	Price discrimination and bundling II
6	Oct 16	Advertising
7	Oct 23	Dynamic pricing I: monopoly
8	Oct 30	Dynamic pricing II: competition and collusion
9	Nov 6	Behavioral IO I
10	Nov 13	Behavioral IO II
11	Nov 20	Vertical relationship
	Nov 27	<i>No Class</i>
12	Dec 4	Networks and two-sided markets
13	Dec 11	Revealed preferences test of IO models

2 Reading List

2.1 Basic monopoly and competition

- *Tirole's book (chapters 1.1, 5.1-5.2, 7.1-7.2)
- *Perloff, J. and S. Salop (1985): "Equilibrium With Product Differentiation," *REStud*, 52(1), 107-120.
- *Caplin, A. and B. Nalebuff (1991): "Aggregation and Imperfect Competition: On the Existence of Equilibrium," *ECMA*, 59(1), 25-59.
- Anderson, S., A. de Palma, and J.F. Thisse (1989): "Demand for Differentiated Products, Discrete Choice Models, and the Characteristics Approach," *REStud*, 56(1), 21-35.
- Bagnoli, M. and T. Bergstrom (2005): "Log-concave probability and its applications", *ET*, 26(2), 445-469.
- Gabaix, X., D. Laibson, D. Li, H. Li, S. Resnick, and C. de Vries (2013): "The Impact of Competition on Prices with Numerous Firms," working paper.
- Singh, N. and X. Vives (1984): "Price and Quantity Competition in a Differentiated Duopoly," *RAND*, 15(4), 546-554.

- Vives, X. (1985): “On the Efficiency of Bertrand and Cournot Equilibria with Product Differentiation,” *JET*, 36(1), 166-175.
- Kreps, D. and J. Scheinkman (1983): “Quantity Precommitment and Bertrand Competition Yield Cournot Outcomes,” *Bell J.*, 14(2), 326-337.
- Klemperer, P. and M. Meyer (1989): “Supply Function Equilibria in Oligopoly Under Uncertainty,” *ECMA*, 57(6), 1243-1278.
- Vives, X. (2011): “Strategic Supply Function Competition with Private Information,” *ECMA*, 79(6), 1919-1966.
- Chen, Y. and M. Riordan (2007): “Price and Variety in the Spokes Model,” *EJ*, 117(522), 897-921.
- Weyl, G. and M., Fabinger (2013): “Pass-Through as an Economic Tool: Principle of Incidence under Imperfect Competition,” *JPE*, 121(3), 528-583.

2.2 Search

[Please see the end for a more extensive reading list on search models.]

- *Weitzman, M (1979): “Optimal Search for The Best Alternative,” *ECMA*, 47(3), 641-654.
- Diamond, P. (1971): “A Model of Price Adjustment,” *JET*, 3(2), 156-168.
- *Varian, H. (1980): “A Model of Sales,” *AER*, 70(4), 651-659.
- *Stahl, D. (1989): “Oligopolistic Pricing with Sequential Consumer Search,” *AER*, 79(4), 700-712.
- *Burdett, K. and K. Judd (1983): “Equilibrium Price Dispersion,” *ECMA*, 51(4), 955-970.
- Armstrong, M., J. Vickers, and J. Zhou (2009a): “Consumer Protection and the Incentive to Become Informed,” *JEEA*, 7(2-3), 399-410.
- *Wolinsky, A. (1986): “True Monopolistic Competition as a Result of Imperfect Information,” *QJE*, 101(3), 493-512.
- Baye, M. and J. Morgan (2001): “Information Gatekeepers on the Internet and the Competitiveness of Homogeneous Product Markets,” *AER*, 91(3), 454-474.
- Anthey, S. and G. Ellison (2011): “Position Auctions with Consumer Search,” *QJE*, 26(3), 1213-1270.
- Armstrong, M., J. Vickers, and J. Zhou (2009b): “Prominence and Consumer Search,” *RAND*, 40(2), 209-233.
- Bar-Issac, H., G. Caruana, and V. Cunat (2012): “Search, Design, and Market Structure,” *AER*, 102(2), 1140-1160.
- Rhodes, A. (2014): “Multiproduct Retailing,” forthcoming in *REStud*.
- Zhou, J. (2014): “Multiproduct Search and the Joint Search Effect,” *AER*, 104(9), 2918-2939.

- Sorensen, A. (2000): “Equilibrium Price Dispersion in Retail Markets for Prescription Drugs,” *JPE*, 108(4), 833-850.
- Hortacsu, A. and C. Syverson (2004): “Product Differentiation, Search Costs and Competition in the Mutual Fund Industry: A Case Study of S&P 500 Index Funds,” *QJE*, 119(2), 403-456.
- *Burdett, K. and D. Mortensen (1998): “Wage Differentials, Employer Size, and Unemployment,” *IER*, 39(2), 257-273.
- *Mortensen, D. and R. Wright (2002): “Competitive Pricing and Efficiency in Search Equilibrium,” *IER*, 43(1), 1-20.
- *Burdett, K. and M. Coles (1997): “Marriage and Class,” *QJE*, 112(1), 141-168.
- *Shimer, R. and L. Smith (2000): “Assortative Matching and Search,” *ECMA*, 68(2), 343-369.
- Burdett, K. and M. Coles (1999): “Long-Term Partnership Formation: Marriage and Employment,” *EJ*, 109(456), F307-F334.
- Rubinstein, A. and A. Wolinsky (1987): “Middlemen,” *QJE*, 102(3), 581-593.
- Duffie, D., N. Garleanu, L. Pedersen (2005): “Over-the-Counter Markets,” *ECMA*, 73(6), 1815-1847.
- Spulber, D. (1996): “Market Making by Price-Setting Firms,” *REStud*, 63(4), 559-580.
- Galenianos, M., R. Pacula, and N. Persico (2012): “A Search-Theoretic Model of the Retail Market for Illicit Drugs,” *REStud*, 79(3), 1239-1269.

2.3 Price discrimination and bundling

- *Tirole’s book (chapter 3)
- Armstrong, M. (2006): “Recent Developments in the Economics of Price Discrimination,” Chapter 4 in *Advances in Economics and Econometrics: Theory and Applications, Ninth World Congress*. Vol. 2.
- Stole, L. (2007): “Price Discrimination in Competitive Environments”, *Handbook of Industrial Organization*, Vol. 3.
- *Varian, H. (1985): “Price Discrimination and Social Welfare,” *AER*, 75(4), 870-875.
- Aguirre, I., S. Cowan, and J. Vickers (2010): “Multiproduct Price Discrimination and Demand Curvature,” *AER*, 100(4), 1601-1615.
- Bergemann, D., B. Brooks, and S. Morris (2013): “The Limits of Price Discrimination,” working paper.
- Mussa, M. and S. Rosen (1978): “Monopoly and Product Quality,” *JET*, 18(2), 301-317.
- Maskin, E., and J. Riley (1984): “Monopoly with Incomplete Information,” *RAND*, 15(2), 171-196.

- Deneckere, R. and P. McAfee (1996): “Damaged Goods,” *JEMS*, 5(2), 149-74.
- *Courty, P., and H. Li (2000): “Sequential Screening,” *REStud*, 67(4), 697-717.
- Fudenberg, D. and M. Villas-Boas (2006): “Behavior-Based Price Discrimination and Customer Recognition,” Chapter 7 in *Economics and Information Systems*. Vol I.
- Chen, Y. (1997): “Paying Customers to Switch”, *JEMS*, 6(4), 877-897.
- Fudenberg, D. and J. Tirole (2000): “Customer Poaching and Brand Switching,” *RAND*, 31(4): 634–657.
- Holmes, T. (1989): “The Effects of Third-Degree Discrimination in Oligopoly,” *AER*, 79(1), 244-250.
- Corts, K. (1998): “Third-Degree Price Discrimination in Oligopoly: All-Out Competition and Strategic Commitment,” *RAND*, 29(2), 306-323.
- *Armstrong, M. and J. Vickers, J. (2001): “Competitive Price Discrimination,” *RAND*, 32(4), 579-605.
- *Rochet, J., and L. Stole (2002): “Nonlinear Pricing with Random Participation,” *REStud*, 69(1), 277-311.
- Garrett, D., Gomes, R., and L. Maestri (2014): “Competitive Screening under Heterogeneous Information,” working paper.
- Borenstein, S. and N. Rose (1994): “Competition and Price Dispersion in the U.S. Airline Industry,” *JPE*, 102(4), 653–683.
- Shepard, A. (1991): “Price Discrimination and Retail Configuration,” *JPE*, 99(1), 30–53.
- Leslie, P. (2004): “Price Discrimination in Broadway Theater,” *RAND*, 35(3), 520-541.
- *McAfee, P., J. McMillan, and M. Whinston (1989): “Multiproduct Monopoly, Commodity Bundling, and Correlation of Values,” *QJE*, 104(2), 371–83.
- Armstrong, M. (1996): “Multiproduct Nonlinear Pricing,” *ECMA*, 64(1), 51–75.
- Chen, Y., and M. Riordan (2013): “Profitability of Product Bundling,” *IER*, 54(1), 35–57.
- Chu, C., P. Leslie, and A. Sorensen (2011): “Bundle-Size Pricing as an Approximation to Mixed Bundling,” *AER*, 101(1), 263–303.
- Matutes, C., and P. Regibeau (1988): “Mix and Match: Product Compatibility Without Network Externalities,” *RAND*, 19(2), 221–234.
- Economides, N. (1989): “Desirability of Compatibility in the Absence of Network Externalities,” *AER*, 79(5), 1165–1181.
- Armstrong, M., and J. Vickers (2010): “Competitive Non-linear Pricing and Bundling,” *REStud*, 77(1), 30–60.

- Hurkens, S., D. Joen, and D. Menicucci (2013): “Dominance and Competitive Bundling,” working paper.
- *Zhou, J. (2014): “Competitive Bundling,” working paper.
- *Whinston, M. (1990): “Tying, Foreclosure, and Exclusion,” *AER*, 80(4), 837–859.
- Armstrong, M. (2013): “A More General Theory of Commodity Bundling,” *JET*, 148(2), 448–472.
- Crawford, G., and A. Yurukoglu (2012): “The Welfare Effects of Bundling in Multichannel Television Markets,” *AER*, 102(2), 643–685.
- Ho, K., J. Ho, and J. Mortimer (2012): “The Use of Full-Line Forcing Contracts in the Video Rental Industry,” *AER*, 102(2), 686–719.

2.4 Advertising

- Bagwell, K. (2007): “The Economic Analysis of Advertising,” Handbook of Industrial Organization, Vol III.
- Butters, G. (1977): “Equilibrium Distributions of Sales and Advertising Prices,” *REStud*, 44(3), 465–491.
- *Robert, J. and D. Stahl (1993): “Informative Price Advertising in a Sequential Search Model,” *ECMA*, 61(3), 657–686.
- *Johnson, J. and D. Myatt (2006) “On the Simple Economics of Advertising, Marketing and Product Design,” *AER*, 96(3), 757–784.
- Becker, G. and K. Murphy (1993): “A Simple Theory of Advertising as a Good or Bad,” *QJE*, 108(4), 941–64.
- Milgrom, P. and J. Roberts (1986): “Price and Advertising Signals of Product Quality,” *JPE*, 94(4), 796–821.
- Anderson, S. and Renault, R. (2006): “Advertising Content,” *AER*, 96(1), 93–113.
- Kamenica, E. and M. Gentzkow (2011): “Bayesian Persuasion,” *AER*, 101(6), 2590–2615.
- Anderson, S. and A. de Palma (2012): “Competition for attention in the Information (overload) Age,” *RAND*, 43(1), 1–25.
- Akerberg, D. (2001): “Empirically Distinguishing Informative and Prestige Effects of Advertising,” *RAND*, 32(2), 316–33.

2.5 Dynamic pricing: durable goods monopoly

[It is also about intertemporal price discrimination. Please see the end for a more extensive reading list on this topic.]

- *Tirole’s book (chapter 1.5)
- Coase, R. (1972): “Durability and Monopoly,” *Journal of Law and Economics*, 15(1), 143–149.

- Waldman, M. (2003): “Durable Goods Theory for Real World Markets,” *JEP*, Vol. 17, pp. 131-154.
- *Stokey, N. (1979): “Intertemporal Price Discrimination,” *QJE*, Vol. 93, pp. 355-371.
- Board, S. (2008): “Durable-Goods Monopoly with Varying Demand,” *REStud*, Vol. 75, pp. 391-413.
- Stokey, N. (1981): “Rational Expectations and Durable Goods Pricing,” *Bell Journal of Economics*, Vol. 12, pp. 112-128.
- *Bulow, J. (1982): “Durable-goods monopolists,” *JPE*, Vol.90, pp. 314-332.
- *Gul, F., H. Sonnenschein, and R. Wilson, “Foundations of Dynamic Monopoly and the Coase Conjecture,” *JET*, 39 (1986), pp. 155-190.
- Fudenberg, D., Levine D. and Tirole, J. (1985): “Infinite-horizon Models of Bargaining with One-Sided Incomplete Information,” In *Game Theoretic Models of Bargaining*, ed. Roth, A., 73-98. Cambridge, MA: Cambridge University Press.
- Ausubel, L. and Deneckere, R. (1989): “Reputation in Bargaining and Durable Goods Monopoly,” *ECMA*, Vol.57, pp. 511-531.P.
- Dudine, P., I. Hendel, and A. Lizzeri (2006): “Storable Good Monopoly: The Role of Commitment,” *AER*, 96(5): 1706-1719.
- Board, S. and M. Pycia (2013): “Outside Options and the Failure of the Coase Conjecture,” *AER*, 104(2), 656-671.
- *William Fuchs and Andrzej Skrzypacz (2010): “Bargaining with Arrival of New Traders,” *AER*, 100, 802-836.
- Judith Chevalier and Austan Goolsbee, “Are Durable Goods Consumers Forward Looking? Evidence from College Textbooks,” *QJE*, 124, (2009), 1853-1884.

2.6 Dynamic pricing: competition and collusion

- *Tirole’s book (chapter 6)
- *Rotemberg, J. and G. Saloner (1986): “A Supergame-Theoretic Model of Price Wars during Booms,” *AER*, 76(3), 390–407.
- Green, E. and R. Porter (1984): “Noncooperative Collusion Under Imperfect Price Information,” *ECMA*, 52(1), 87–100.
- Maskin, E. and J. Tirole (1988): “A Theory of Dynamic Oligopoly II: Price Competition, Kinked Demand Curves, and Edgeworth Cycles,” *ECMA*, 56(3), 571–99.
- Bagwell, K. and S. Athey (2001): “Optimal Collusion with Private Information,” *RAND*, 32(3), 428–65.
- Harrington, J. and A. Skrzypacz (2011): “Private Monitoring and Communication in Cartels: Explaining Recent Collusive Practices,” *AER*, 101(6), 2425–49.

- Porter, R. (1983): “A Study of Cartel Stability: The Joint Economic Committee, 1880–1886,” *Bell Journal of Economics*, 14(2), 301–14.
- Noel, M. (2007): “Edgeworth Price Cycles: Evidence from the Toronto Retail Gasoline Market,” *JINDE*, 55(1), 69–92.
- Wang, Z. (2009): “(Mixed) Strategy in Oligopoly Pricing: Evidence from Gasoline Price Cycles Before and Under a Timing Regulation,” *JPE*, 117(6), 987–1030.
- McCutcheon, B. (1997): “Do Meetings in Smoke-Filled Rooms Facilitate Collusion?” *JPE*, 105(2), 330–50.

2.7 Vertical relationship

- *Tirole’s book (chapter 4)
- *Rey, P. and J. Tirole (2007): “Primer on Foreclosure,” *Handbook of Industrial Organization*, Vol. 3.
- Rey, P. and J. Tirole (1986): “The Logic of Vertical Restraints,” *AER*, 76(5), 921-939
- Hart, O. and J. Tirole (1990): “Vertical Integration and Market Foreclosure,” *Brookings Papers on Economic Activity*.
- Salinger, M. (1988): “Vertical Mergers and Market Foreclosure,” *QJE*, 103(2), 345-356.
- Riordan, M. (1998): “Anticompetitive Vertical Integration by a Dominant Firm,” *AER*, 88(5), 1232-48.
- Chen, Y. (2001): “On Vertical Mergers and Their Competitive Effects,” *RAND*, 32(4), 667-685.
- Nocke, V. and L. White (2007): “Do Vertical Mergers Facilitate Upstream Collusion?” *AER*, 97(4), 1321-1339.
- Loertscher, S. and M. Reisinger (2014): “Market Structure and the Competitive Effects of Vertical Integration,” *RAND*, forthcoming.
- McAfee, P. and M. Schwarz (1994), “Opportunism in Multilateral Vertical Contracting: Nondiscrimination, Exclusivity, and Uniformity”, *AER*, 84(1), 210-230.
- Calzolari, G., and V. Denicolo (2013): “Competition with Exclusive Contracts and Market Share Discounts,” *AER*, 103(6), 2384–2411.
- Bernheim, B. and M. Whinston (1998): “Exclusive Dealing,” *JPE*, 106(1), 64-103.
- Rasmusen, R., M. Ramseyer and J. Wiley (1991): “Naked Exclusion,” *AER*, 81(5), 1137-1145.
- Segal, I. and M. Whinston (2000): “Naked Exclusion: Comments” *AER*, 90(1), 296-309.
- Asker, J. and H. Bar-Isaac (2014): “Raising Retailers’ Profits: On Vertical Practices and the Exclusion of Rivals,” *AER*, 104(2), 672-686.
- Chipty, T. (2001): “Vertical Integration, Market Foreclosure and Consumer Welfare in the Cable Television Industry,” *AER*, 91(3) 428-453.

- Hastings, J. (2004): “Vertical Relationships and Competition in Retail Gasoline Markets,” *AER*, 94(1), 317-328.
- Mortimer, J. (2008): “Vertical Contracts in the Video Rental Industry,” *REStud*, 75(1), 165-199.

2.8 Behavioral IO

[Please see the end for a more extensive reading list on behavioral IO.]

- Spiegler, R. (2011): *Bounded Rationality and Industrial Organization*, Oxford University Press
- *Della Vigna, S. and U. Malmendier (2004): “Contract Design and Self-Control: Theory and Evidence,” *QJE*, 119(2), 353-402.
- DellaVigna, S. and U. Malmendier (2006): “Paying not to go to the gym,” *AER*, 96 (3), 694-719.
- *Gabaix, X., and D. Laibson (2006): “Shrouded Attributes, Consumer Myopia, and Information Suppression in Competitive Markets,” *QJE*, 121(2), 505-540.
- Ellison, G. (2005): “A Model of Add-On Pricing,” *QJE*, 120(2), 585-637.
- *Heidhues, P. and B. Koszegi (2008): “Competition and Price Variation when Consumers Are Loss Averse,” *AER*, 98(4), 1245-1268.
- *Spiegler, R. (2006): “The Market for Quacks,” *REStud*, 73(4), 1113-1131.
- *Spiegler, R. (2006): “Competition over Agents with Boundedly Rational Expectations,” *TE*, 1(2), 207-231.
- Spiegler, R. and M. Piccione (2012): “Price Competition under Limited Comparability,” *QJE*, 127, 97-135.
- Chioveanu, I. and J. Zhou (2013): “Price Competition With Consumer Confusion”, *Management Science*, 59(11), 2450-2469.
- Baye, M. and J. Morgan (2004): “Price Dispersion in the Lab and on the Internet,” *RAND*, 35(3), 449-466.
- Bachi, B. and Spiegler, R. (2014): “Buridanic Competition,” working paper.
- Grubb, M. (2014): “Consumer Inattention and Bill-Shock Regulation,” *REStud*, forthcoming.
- Grubb, M. and M. Osborne (2014): “Cellular Service Demand: Biased Beliefs, Learning, and Bill Shock,” *AER*, forthcoming.

2.9 Network and two-sided markets

- *Tirole's book (chapter 10.6)
- Farrell, J. and P. Klemperer (2007): "Coordination and Lock-In: Competition with Switching Costs and Network Effects," *Handbook of Industrial Organization*, Vol 3.
- Farrell, J. and G. Saloner (1985): "Standardization, Compatibility, and Innovation," *RAND*, 16(1), 70–83.
- Katz, M. and C. Shapiro (1986): "Technology Adoption in the Presence of Network Externalities," *JPE*, 94(4), 822–41.
- Cabral, L. (2011): "Dynamic Price Competition With Network Effects," *REStud*, 78(1), 83–111.
- *Armstrong, M. (2006): "Competition in Two-Sided Markets," *RAND*, 37(3), 668–691.
- Rochet, J. and J. Tirole (2006): "Two-Sided Markets: A Progress Report," *RAND*, 37(3), 645–667.
- Lerner, J. and J. Tirole (2006): "A Model of Forum Shopping," *AER*, 96(4), 1091–113.
- *Weyl, G. (2010): "A Price Theory of Multi-sided Platforms," *AER*, 100(4), 1642–72.
- Lee, R. (2013): "Vertical Integration and Exclusivity in Platform and Two-Sided Markets", *AER*, 103(7), 2960–3000.
- Rysman, M. (2004): "Competition Between Networks: A Study of the Market for Yellow Pages", *REStud*, 71(2), 483–512.

2.10 Revealed preferences test of IO models

- *Carvajal, A., R. Deb, J. Fenske, and J. Quah (2013): "Revealed Preference Test of the Cournot Model," *ECMA*, 81(6), 2351–2379.
- Lazzati, N. (2014): "Simultaneous Choice Models: The Sandwich Approach to Nonparametric Analysis," working paper.
- Cherchye, L., T. Demuynck, and B. de Rock (2013): "The Empirical Content of Cournot Competition," *JET*, 148, 1552–1581.
- de Clippel, G. and K. Rozen (2014): "Bounded Rationality and Limited Datasets," working paper.

3 Tips for Reading Papers

[written by Heski Bar-Isaac]

A good way to think about how to read papers is to think about how to write them to this end, see McCloskey *Economical Writing* and Thomson's *Guide to the Young Economist*.

There are a number of questions worth keeping in mind when reading a theory paper, unsurprisingly perhaps they turned out not to be shockingly different to those you should consider when reading an empirical paper as well...

1. What is the paper about?
 - What is the central question in the paper?
 - What is the bottom line?
 - If Boyan Jovanovic stopped you in the elevator and asked you “What was that paper about?” What would you tell him?
2. Even before getting into the nuts and bolts.
 - Is it in an interesting question? Is it one you have given any thought to before? Do you care what the answer will be? How does it help you understand the world?
 - Given the question, what would you answer? What do you think are the key forces/mechanisms at work in the economic situation? (if you have a view, you can better assess whether the paper is reasonable and/or insightful)
 - What is their basic answer? What is the consequence/implications of the result? Are there are other relevant applications of the insight?
3. Next (if you still care) take a look at the model. In most new applied theory, things are set up as a game, and so get clear the underlying structure of the game.
 - Who are the players and how many?
 - What are actions/strategies
 - Rules/timing etc
 - Payoffs
 - Information assumptions (what do they know, about each other, structure of game etc and when)
 - What is the equilibrium notion?
4. As you get more experience this will be easier to address, in the meantime, this may require going back and reading through the references etc. What is unusual in the structure of the game (Different functional form for payoff, different kind of information problem? Etc)
5. (Usually this will have something to do with step 4) What is the key driver of the result? What is the driving economic mechanism, where are any unusual assumptions really playing a role (If you can't see what the driving economic mechanism is, be suspicious!)
6. If you've seen the central forces, how they tie up to the particular set-up of the model, it's easier then to think about how plausible the mechanism in the application, how particular it is to the set-up, how robust the effect is, or how sensitive to particular and/or peculiar assumptions

7. Remember Alfred Marshall's advice to Pigou: "(1) Use mathematics as shorthand language, rather than as an engine of inquiry. (2) Keep to them till you have done. (3) Translate into English. (4) Then illustrate by examples that are important in real life (5) Burn the mathematics. (6) If you can't succeed in 4, burn 3. This I do often." (Buchholz, Todd G. 1989. *New Ideas from Dead Economists*. New York: Penguin Group. p. 151) ... in much of the course we may be focused on stage (1) and (2).

4 Papers for Presentation

- Vives, X. (2011): "Strategic Supply Function Competition with Private Information," *ECMA*, 79(6), 1919-1966.
- Janssen, M. and S. Shelegia (2014): "Consumer Search and Double Marginalization," working paper.
- Bar-Issac, H., G. Caruana, and V. Cunat (2012): "Search, Design, and Market Structure," *AER*, 102(2), 1140-1160.
- Bergemann, D., B. Brooks, and S. Morris (2013): "The Limits of Price Discrimination," working paper.
- de Clippel, G., Eliaz, K. and K. Rozen (2014) "Competing for Consumer Inattention", forthcoming *JPE*
- Benabou, R. and J. Tirole (2013) "Bonus Culture: Competitive Pay, Screening, and Multi-tasking", mimeo.
- Board, S. and M. Pycia (2013): "Outside Options and the Failure of the Coase Conjecture," *AER*, 104(2), 656-671.
- Hörner, J. and Samuelson, L. (2011): "Managing Strategic Buyers," *JPE*, Vol. 119, pp. 379-425.
- de Roos, N. and V. Smirnov (2014): "Collusion with Intertemporal Price Dispersion," working paper.
- Grubb, M. (2009): "Selling to Overconfident Consumers," *AER*, 99(5), 1770-1807.
- Bachi, B. and Spiegler, R. (2014): "Buridanic Competition," working paper.
- Asker, J. and H. Bar-Isaac (2014): "Raising Retailers' Profits: On Vertical Practices and the Exclusion of Rivals," *AER*, 104(2), 672-686.

More papers on search

Useful survey papers:

- Baye, M., J. Morgan, and P. Scholten (2006): “Information, Search, and Price Dispersion,” in *Handbook of Economics and Information Systems*, Amsterdam
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1. Basic Models

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Decentralized matching with search frictions:

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Search agency:

- Lewis, T. (2012): “A Theory of Delegated Search for the Best Alternative,” *RAND*, 43(3), 391-416.
- Lewis, T. and M. Ottaviani: “Search Agency,” working paper.
- Ulbricht, R. (2014): “Optimal Delegated Search with Adverse Selection and Moral Hazard,” working paper.

[Note: We have ignored a few branches of search models developped in the labor search literature (especially directed search models).]

2. Applications

Search models can be used to address lots of economic issues in IO. Here are a few examples:

Search, advertising, and information platform:

- Butters, G. (1977): “Equilibrium Distributions of Sales and Advertising Prices,” *REStud*, 44(3), 465-491.
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Search and learning:

- Rothschild, M. (1974): “Searching for the Lowest Price When the Distribution of Prices Is Unknown,” *JPE*, 82(4), 689-711.
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Prominence (paid placements/sponsor links) and non-random search:

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- Ellison, G. and A. Wolitzky (2012): “A Search Cost Model of Obfuscation,” *RAND*, 43(3), 417-441.
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- Goldmanis, M., A. Hortacsu, C. Syverson, and O. Emre (2010): “E-Commerce and the Market Structure of Retail Industries,” *EJ*, 120(545), 651-682.

More paper on behavioral IO

Books and survey papers:

- *Spiegler, R. (2011): *Bounded Rationality and Industrial Organization*, Oxford University Press
- Ellison, G. (2006): “Bounded Rationality and IO,” in *Advances in Economics and Econometrics: Theory and Applications: Ninth World Congress*, ed. by R. Blundell, W. Newey, and T. Persson, Cambridge University Press.
- Armstrong, M. (2008): “Interactions Between Competition and Consumer Policy,” *Competition Policy International*, 4(1), 97-147.
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- *Grubb, M. (2009): “Selling to Overconfident Consumers,” *AER*, 99(5), 1770-1807.
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- Zhou, J. (2011): “Reference Dependence and Market Competition,” *JEMS*, 20(4), 1073-1094.
- Karle, H. and M. Peitz (2013): “Competition Under Consumer Loss Aversion,” forthcoming in *RAND*.
- Armstrong, M. and Y. Chen (2013): “Discounting Pricing,” working paper.
- Bordalo, P., N. Gennaioli, and A. Shleifer (2013): “Competition for Attention,” working paper.
- Koszegi, B. and A. Szeidl (2013): “A Model of Focusing in Economic Choice,” *QJE*, 128(1), 53-107.

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- Spiegler, R. and K. Eliaz (2011): “Consideration Sets and Competitive Marketing,” *REStud*, 78, 235-262.
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[Note: There are more topics in behaviroal economics and bounded rationality in general. Here we only discuss the “biases” or “non-standard behavior” of which economists have found useful applications in IO.]

More papers on durable goods pricing

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- Riley and Zeckhauser (1983): “Optimal Selling Strategies: When to Haggle, When to Hold Firm,” *QJE*, Vol. 98, pp. 267-289.
- Board, S. (2008): “Durable-Goods Monopoly with Varying Demand,” *REStud*, Vol. 75, pp. 391-413.
- Board, S. and A. Skrzypacz (2013): “Revenue Management with Forward Looking Buyers,” working paper.
- *Tirole’s book (Chapter 1)

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- Sobel, J. (1991): “Durable Goods Monopoly with Entry of New Consumers,” *ECMA*, Vol. 59, pp. 1455-1485.
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- Hörner, J. and Samuelson, L. (2011): “Managing Strategic Buyers,” *JPE*, Vol. 119, pp. 379-425.