University of Southern California Department of Economics

Economics 680

Industrial Organization and Business Strategy: Theory and Applications

(Fall 2022)

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Office and Office Hours: KAP 334B, Tuesday 5:20-6:30PM or by appointment

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Class Meeting Time and Location: 2-5:20PM Tuesday, KAP 335

<u>Outline</u>: In this course we study the economic theory of industrial organization and business strategy with applications. Topics typically include consumer demand with discrete choices and/or continuous choices, multi-product monopoly pricing, monopoly price discrimination, bundling, tied-in selling and other forms of nonlinear pricing, horizontal competitive strategy, product differentiation and non-price competition, vertical organization strategy, vertical contracts, entry and exit, co-operation and collusion, innovation incentives and patent royalties, network effects, two-sided markets, horizontal and vertical mergers, competitive bidding, and antitrust/competition policy. Some empirical studies and industry-specific studies will also be discussed. The course will stress a basic understanding of the theory, with attention paid to modeling skills and opportunities for research.

<u>Requirement</u>: Several problem sets (30%), participation, discussion and presentation in the class (40%), and a research paper (30%).

- The requirement for a research paper will be discussed during the semester. A research proposal will be due by *October 11th*. A revision of the research proposal will be submitted in the following two weeks. The final paper should be submitted before *December 6th*.
- Each student will select and present at least one paper (published or working paper) carefully in class (depending on the class size). Feel free to choose which paper to present (subject to the instructor's approval). A list of papers will be suggested during the semester. Students are expected to ask questions and make comments during each presentation.
- Participants are also expected to read regularly newspapers (e.g., The New York Times, or The Wall Street Journal), magazines (e.g., The Economist), and/or

articles from social media for current news and debates on business strategies and public polices toward businesses, which will be discussed regularly in class.

Topics and Reading/Reference Materials (subject to changes): Reading materials will typically include both classical papers and more recent ones - more recent papers will be updated and distributed during the semester).

1. Introduction/Background

- Motivating examples
- The development of the field
- Why, what and how?
- An overview on how to build an IO model
- J. Tirole's textbook on the Theory of Industrial Organization, p.1-50.
- F. Fisher (1989), "Games economists play: A noncooperative view," RAND Journal of Economics 20: 113-124.
- C. Shapiro (1989), "The theory of business strategy," RAND Journal of Economics 20: 125-137.
- R. Schmalensee and R. Willig (1989), eds., *Handbook of Industrial Organization*, Volume 1 and 2, Amsterdam: North-Holland.
- M. Armstrong and R. Porter (2007), eds., *Handbook of Industrial Organization*, Volume 3, Amsterdam: North-Holland.
- K. Ho, A. Hortacsu, and A. Lizzeri (2021), eds., *Handbook of Industrial Organization*, Volume 4, Amsterdam: North-Holland. You may find most chapters available from individual authors' websites.

2. Consumer Demand Formulation

- Classical demand theory with continuous choices
- Product differentiation (horizontal and vertical)
- Consumer discrete choice models, with heterogenous (observable and unobservable) consumer tastes/characteristics and product characteristics
 - Estimating demand systems

Review chapter(s) on consumer theory in standard textbooks of microeconomic theory and discrete choice models in econometrics.

- J. Tirole, p.96-100.
- S. Berry (1994), "Estimating discrete choice models of product differentiation," RAND Journal of Economics 25: 242-262.

- D. Genesove and W. Mullin (1998), "Testing static oligopoly models: Conduct and cost in the sugar industry, 1890-1914," RAND Journal of Economics 29(2): 355-377.
- D. McFadden (2001), "Economic choices," American Economic Review 91: 351-378.

3. Monopoly Pricing Strategy

- Monopoly pricing: an overview
- Monopoly cost pass-through rate
- Price discrimination strategies
- Multiproduct pricing strategy: Demand externalities and price coordination, bundled selling
 - Dynamic pricing: Learning consumer demands, durable-good pricing, ...
- Selling formats: posted prices, bargaining, auctioning with competitive bidding, and other conditional pricing practices (CPPs)
 - J. Tirole, p.69-72, 133-166
- M. Armstrong (2006), "Recent developments in the economics of price discrimination," Advances in Economics and Econometrics: Theory and Applications, Ninth World Congress of the Econometric Society, Volume II, Chapter 4, Cambridge University Press.
- J. Gabszewicz, A. Shaked and J. Sutton (1986), "Segmenting the market: The monopolist's optimal product mix." *Journal of Economic Theory* 39: 273-289.
- P. McAfee, J. McMillan, and M. Whinston (1989), "Multiproduct monopoly, commodity bundling, and correlation of values," *Quarterly Journal of Economics* 104: 371-383.
- A. Manelli and D. Vincent, "Bundling as an optimal selling mechanism for a multi-good monopolist," *Journal of Economic Theory*.
- Y. Chen and M. Riordan (2013), "Profitability of product bundling," *International Economic Review* 54 (1): 35-57.
- F. Mathewson and R. Winter (1997), "Tying as a response to demand uncertainty," *RAND Journal of Economics* 28: 566-583.
- M. Armstrong (1999), "Price discrimination by a many-product firm," Review of Economic Studies: 151-168.
- I. Aguirre, S. Cowan, and J. Vickers (2010), "Monopoly price discrimination and demand curvature," *American Economic Review* 100: 1601-1615.
- M. Armstrong (2013), "A more general theory of commodity bundling," *Journal of Economic Theory* 148: 448472.

- D. Bergemann, B. Brooks, and S. Morris (2015), "The limits of price discrimination," *American Economic Review* 105(3): 921-957.
- C. Daskalakis, A. Deckelbaum, and C. Tzamos (2017), "Strong duality for a multiple-good monopolist," *Econometrica* 85 (3): 735-767
- N. Haghpanah and J. Hartline (2021), "When is pure bundling optimal?" Review of Economic Studies 88 (3): 1127-1156.

4. Competitive Strategy

- Classical models of oligopolistic competition
- Understanding the nature of competition: strategic substitutes/complements, implications of demand substitutes/complements and demand externalities
 - Product differentiation strategy and other non-price strategies
 - Marketing strategy (advertising, brand building/extension...)
 - Dynamic competition: Making commitment, first-mover advantage
 - J. Tirole, p.207-234, 277-302.
- C. d'Aspremont, J. Gabszewicz, and F. Thisse (1979), "On Hotelling's stability in competition," *Econometrica* 47: 1145-1150.
- A. Shaked and J. Sutton (1982), "Relaxing price competition through product differentiation," *Review of Economic Studies* 49: 3-14.
- D. Kreps and J. Scheinkman (1983), "Quantity precommitment and Bertrand competition yield Cournot outcomes," *Bell Journal of Economics* 14: 326-337.
- D. Fudenberg and J. Tirole (1984), "The fat cat effect, the puppy dog ploy, and the lean-and-hungry look," *American Economic Review* 74: 361-366.
- J. Bulow, J. Geanakoplos and P. Klemperer (1985), "Multimarket oligopoly: Strategic substitutes and complements," *Journal of Political Economy* 93: 488-511.
- J.M. Perloff and S. C. Salop (1985), "Equilibrium with product differentiation." The Review of Economic Studies 52(1): 107120.
- P. Klemperer and M. Meyer (1989), "Supply function equilibria in oligopoly under uncertainty," *Econometrica* 57: 1243-1277.
- A. Caplin and B. Nalebuff (1991), "Aggregation and imperfect competition: On the existence of equilibrium." *Econometrica* 59 (1), 25-59.
- S. Anderson, A. de Palma and J. Thisse (1992), Discrete Choice Theory of Product Differentiation, Cambridge: MIT Press.
- S. Anderson, A. De Palma, and Y. Nesterov (1995), "Oligopolistic competition and the optimal provision of products." *Econometrica* 63 (6): 1281-1301.
- M. Armstrong and J. Vicker (2001), "Competitive price discrimination," *RAND Journal of Economics* 32: 579-605.

- J. Johnson and D. Myatt (2003), "Multiproduct quality competition: Fighting brands and product line pruning," *American Economic Review* 93: 748-774.
- G. Tan and L. Yuan (2003), "Strategic incentives of divestitures of competing conglomerates," *International Journal of Industrial Organization* 21: 673-697.
- A. Cohen (2008), "Package size and price discrimination in the paper towel market," *International Journal of Industrial Organization* 26: 502516.
- M. Armstrong and J. Vicker (2009), "Competitive nonlinear pricing and bundling," *Review of Economic Studies* 77(1): 30-60.
- Z. Chen and P. Rey (2012), "Loss-leading as an exploitative practice," *American Economic Review* 102 (7): 3462-3482.
- G. Weyl and M. Fabinger (2013), "Pass-through as an economic tool: Principles of incidence under imperfect competition." *Journal of Political Economy* 121 (3), 528-583.
- D. Quint (2014), "Imperfect competition with complements and substitutes," *Journal of Economic Theory* 152: 266-290.
 - J. Zhou (2017), "Competitive bundling," Econometrica 85(1): 145-172.
- V. Nocke and N. Schutz (2018), "Multiproduct-firm oligopoly: An aggregative games approach." *Econometrica* 86(2): 523-557.
- M. Armstrong and J. Vickers (2018), "Multiproduct pricing made simple," *Journal of Political Economy* 126 (4): 1444-1471.
- Z. Chen and P. Rey (2019), "Competitive cross-subsidization," Rand Journal of Economics 50: 645-665.
- M. Baye and D. Sappington (2019), "Revealing transactions data to third parties: Implications of privacy regimes for welfare in online markets," working paper.
- M. Armstrong and J. Vickers (2021), "Patterns of competitive interactions," *Econometrica* (forthcoming).
- M. Armstrong and J. Zhou (2021), "Consumer information and the limits to competition Λ ," American Economic Review (forthcoming).
- J. Zhou (2020), "Mixed bundling in oligopoly markets," *Journal of Economic Theory* (forthcoming).
- Z. Brown and A. MacKay (2021), "Competition in pricing algorithms," NBER Working Paper 28860: http://www.nber.org/papers/w28860
- J. Tamayo and G. Tan (2022), "Competitive two-part tariffs," working paper, USC.

5. Entry Barriers and Entry Strategies

— Entry deterrence strategies: Pricing, advertising, bundling/tying, contracting,

. . .

- Entry accommodation
- Entry strategies: choices of market segment, entry scale,...
- J. Tirole, p.305-356.
- K. Judd (1985), "Credible spatial preemption," RAND Journal of Economics 16: 153-166.
- P. Aghion and P. Bolton (1987), "Contracts as a barrier to entry," *American Economic Review* 77: 388-401.
- M. Whinston (1990), "Tying, foreclosure, and exclusion," *American Economic Review* 80: 837-859.
- K. Hendricks, M. Piccione and G. Tan (1997), "Entry and exit in hub-spoke networks," *RAND Journal of Economics* 28: 291-303.
- B. Nalebuff (2004), "Bundling as an entry deterrent," Quarterly Journal of Economics: 159-187.

6. Vertical Organization Strategy

- Vertical restraints
- Vertical integration and separation
- Managing vertical relationships
- Organizational scope, make-or-buy decision, the boundary of the firm
- J. Tirole, p.169-198.
- R. Winter (1993), "Vertical control and price versus nonprice competition," Quarterly Journal of Economics 108: 61-76.
- P. Rey and J. Stiglitz (1995), "The role of exclusive territories in producers' competition," *RAND Journal of Economics* 26: 431-451.
- Y. Chen (1999), "Oligopoly price discrimination and resale price maintenance," *RAND Journal of Economics*, 441-455.
- Y. Chen (2001), "On vertical mergers and their competitive effects," RAND Journal of Economics 32: 667-685.
- P. McAfee and M. Schwartz (1994), "Opportunism in multilateral contracting: Nondiscrimination, exclusivity and uniformality," *American Economic Review:* 210-30.
- D. O'Brian and G. Shaffer (1992), "Vertical control and bilateral contracts," *RAND Journal of Economics*: 299-308.
- I. Segal and M. Whinston (2000), "Exclusive contracts and protection of investments," *RAND Journal of Economics* 31: 603-633.
- I. Segal and M. Whinston (2003), "Robust predictions for bilateral contracting with externalities," *Econometrica*: 757-91.

- Y. Chen and M. Riordan (2007), "Vertical integration, exclusive dealing, and ex post cartelization," RAND Journal of Economics 38: 1-21.
- H. Horn and A. Wolinsky (1988), "Bilateral monopolies and incentives for mergers," RAND Journal of Economics 19: 408-419.
- A. Collard-Wexier, G. Gowrisankaran, and R. Lee (2019), "Nash-in-Nash bargaining: A microfoundation for applied work, *Journal of Political Economy* 127(1): 163-195.
- G. Calzolari and V. Denicolo (2013), "Competition with exclusive contracts and market share discounts," *American Economic Review* 103 (6): 2384-2411.
- N. Figueroa, E. Ide, and J. Montero (2016), "Discounts as a barrier to entry," *American Economic Review* 106 (7): 1849-1877.
- Y. Chao, G. Tan, and A. Wong (2018), "All-units discounts as a partial foreclosure device," *RAND Journal of Economics* 49 (1): 155-180.
- Y. Chao, G. Tan, A. Wong (2019). "Asymmetry in capacity and the adoption of all-units discounts," *International Journal of Industrial Organization* 65: 152-172.
- Y. Chao, G. Tan, and A. Wong (2022), "Optimal nonlinear pricing by a dominant firm under competition," *American Economic Journal: Microeconomics* 14(2): 240-280.
- G. Tan and A. Wong (2022), "Market-Share Contracts by a Dominant Firm," working paper.

7. Innovation, Standard Essential Patents, and Patent Royalty

- Competition and innovation incentives
- R&D strategies
- Optimal licensing strategies
- Protecting IPRs: firm strategy and public policy
- Standard Setting Organizations (SSOs), Standard Essential Patents (SEPs), and FRAND royalty rates
- R. Gilbert and D. Newbery (1982), "Preemptive patenting and the persistence of monopoly," *American Economic Review*: 514-526.
- J. Reinganum (1983), "Uncertain innovation and the persistence of monopoly," *American Economic Review*: 741-748.
- K. Krishna (1993), "Auctions with endogenous valuations: The persistence of monopoly revisited," *American Economic Review* (1993) 147-60.
- Y. Chen (2000), "Strategic bidding by potential competitors: Will monopoly persist?" *Journal of Industrial Economics*: 741-748.

- J. Green and S. Scotchmer, "On the division of profit in sequential innovation," *RAND Journal of Economics*: 20-33.
- S. Scotchmer (1996), "Protecting early innovations: should second-generation products be patentable?" RAND Journal of Economics: 322-331.
- J. Lerner and J. Tirole (2004), "Efficient patent pool," American Economic Review 94(3): 691-711.
- J. Lerner and J. Tirole (2006), "A model of forum shoppong," *American Economic Review* 96(4): 1091-1113.
 - S. Scotchmer (2006), Innovation and Incentives, The MIT Press.
- B. Chiao, J. Lerner, and J. Tirole (2007), "The rules of standard-setting organizations: an empirical analysis." *RAND Journal of Economics* 38(4): 905-930.
- G. Leonard and M. Lopez (2014), "Determining RAND royalty rates for standard-essential patents," *Antitrust* 29(1):86-94.
- J. Lerner and J. Tirole (2015), "Standard-essential patents," *Journal of Political Economy* 123(3): 547-586.
- X. Fu, G. Tan, and J. Wang (2022), "Policy orientations and technology choices in standard setting," working paper, USC.

8. Competition, Collusion and Cooperation

- Strategic alliance, research joint ventures, joint marketing agreements
- Dynamic price competition and tacit cooperation
- J. Tirole, p.239-274.
- E. Green and R. Porter (1984), "Non-cooperative collusion under imperfect price information," *Econometrica* 52: 87-100.
- T. Bresnahan (1987), "Competition and collusion in the American automobile industry: The 1955 price war." *Journal of Industrial Economics* 35: 457-482.
- D. Bernheim and M. Whinston (1990), "Multimarket contact and collusive behavior," *RAND Journal of Economics* 21: 1-26.
- Z. Chen and T. Ross (2000), "Strategic alliances, shared facilities and entry deterrence," RAND Journal of Economics 31: 326-344.
- E. Calvano, G. Calzolari, V. Denicol, and S. Pastorello (2021), "Algorithmic collusion with imperfect monitoring," *International Journal of Industrial Organization*.
- E. Calvano, G. Calzolari, V. Denicol, and S. Pastorello (2020), "Artificial intelligence, algorithmic pricing and collusion," *American Economic Review*.

9. Switching Costs, Demand Complementarity, Networks, and Network Effects

- How consumer switching-costs affect competition
- Network effects, network industries
- P. Klemperer (1995) "Competition when consumers have switching costs: An overview." Review of Economic Studies: 515-539.
- P. Klemperer (1987), "The competitiveness of markets with switching costs," RAND Journal of Economics: 138-150.
- M. Katz and C. Shapiro, "Network externalities, competition and compatibilities," *American Economic Review* 75: 424-40.
- J. Farrell and P. Klemperer (2007), "Coordination and lock-in: Competition with switching costs and network effects," in M. Armstrong and R. Porter, eds. *Handbook of Industrial Organization*, Vol.3, North-Holland: Amsterdam.
- Besen, S. M. and Farrell, J. (1994), "Choosing how to compete: Strategies and tactics in standardization," *Journal of Economic Perspectives* 8: 117-31.
- N. Gandal, M. Kende, and R. Rob (2000), "The dynamics of technological adoption in hardware/software systems: The case of compact disc players," *RAND Journal of Economics* 31: 43-61.
- Y. Chen (1997), "Paying customers to switch," Journal of Economics and Management Strategy 6: 877-897.
- D. Fudenberg and J. Tirole (2001), "Customer poaching and brand switching", RAND Journal of Economics: 634-657.
- K. Hendricks, M. Piccione and G. Tan (1995), "The economics of hubs: The case of monopoly," *Review of Economic Studies* 62: 83-99.
- K. Hendricks, M. Piccione and G. Tan (1999), "Equilibria in networks," *Econometrica* 67: 1407-1434.
- M. Armstrong (1998), "Network interconnection in telecommunications," *Economic Journal* 108: 545-564.
- J.-J. Laffont, P. Rey and J. Tirole (1998), "Network competition: I. Overview and nondiscriminatory pricing." *RAND Journal of Economics* 29: 1-37.
- H. Ju and G. Tan (2016), "Bilateral market structures and regulatory policies in international telephone markets," *International Economic Review* 57: 393-423.
- J. Carrillo and G. Tan (2021), "Platform competition with complementary products," *International Journal of Industrial Organization* 77.

10. Platforms and Multi-sided Markets

— Two-sided/multi-sided platform markets, cross-side externalities, demand complementarities, cross-subsidization

- J.-C. Rochet and J. Tirole (2002), "Cooperation among competitors: Some economics of payment card systems." *RAND Journal of Economics* 33: 549-570.
- J.-C. Rochet and J. Tirole (2003), "Platform competition in two-sided markets," *Journal of the European Economic Association* 1: 990-1029.
- J.-C. Rochet and J. Tirole (2006), "Two-sided markets: A progress report." *RAND Journal of Economics* 37: 645-667.
- M. Armstrong (2006), "Competition in two-sided markets," RAND Journal of Economics 37: 668-691.
- J.-C. Rochet and J. Tirole, "Must-take cards: Merchant discounts and avoided costs," *Journal of European Economic Association*.
- G. Weyl (2010), "The price theory of two-sided markets," American Economic Review 100 (4), 16421672.
- B. Jullien (2011), "Competition in multi-sided markets: Divide and conquer." *American Economic Journal: Microeconomics* 3(4): 186219.
- B. Jullien and A. Pavan (2019), "Information management and pricing in platform markets," *The Review of Economic Studies* 86(4), 16661703.
- G. Tan and J. Zhou (2021), "The effects of competition and entry in multi-sided markets," *The Review of Economic Studies* 88: 1002-1030.

11. Auctions, Competitive Bidding and Mergers in Bidding Markets

- R. Myerson (1981), "Optimal auction design," *Mathematics of Operations Research* 6: 58-73.
- P. Milgrom and R. Weber (1982), "A theory of auctions and competitive bidding," *Econometrica* 50: 1089-1122.
- K. Waehrer and M. K. Perry (2003), "The effects of mergers in open-auction markets, *RAND Journal of Economics* 38: 287-304.
- J. Pinkse and G. Tan (2005), "The affiliation effect in first–price auctions," *Econometrica* 73: 263-277.
- G. Tan and O. Yilankaya (2006), "Equilibria in second-price auctions with participation costs," *Journal of Economic Theory* 130: 205-219.
- K. Hendricks, R. Porter and G. Tan (2008), "Bidding rings and the winner's curse," *RAND Journal of Economics* 39: 1018-1041.

12. More Recent Papers for Reading and Presentation (more to come)

Florian Ederer and Bruno Pellegrino (2021), "A Tale of Two Networks: Common Ownership and Product Market Rivalry,"

Jan Eeckhout and Laura Veldkamp (2022), "Data and Market Power,"

Simone Galperti, Aleksandr Levkun and Jacopo Perego (2022), "The Value of Data Records,"

Agarwal and Paulo J. Somaini (2022) "Demand Analysis under Latent Choice Constraints,"

Ali Hortasu, Aniko ry, and Kevin R. Williams (2022), "Dynamic Price Competition: Theory and Evidence from Airline Markets"

Zi Yang Kang and Ellen V. Muir (2022), "Contracting and Vertical Control by a Dominant Platform,"

Andrew Rhodes and Jidong Zhou (2022), "Personalized Pricing and Competition," Matthew Gentzkow, Jesse M. Shapiro, Frank Yang, and Ali Yurukoglu (2022), "Pricing Power in Advertising Markets: Theory and Evidence."

Nima Haghpanah and Ron Siegel (2021), "The Limits of Multi-Product Price Discrimination,"

IN-KOO CHO AND JONATHAN LIBGOBER, "LEARNING UNDERSPECIFIED MODELS,"

Wu (2018), The Curse of Bigness: Antitrust in the New Gilded Age, 154 pages, Columbia Global Reports.

- L. Khan (2017), "Amazon's antitrust paradox," Yale Law Journal 126: 564-907.
- S. Athey and F. Morton (2021), "Platform annexation," Stanford Institute for Economic Policy Research.

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National Suicide Prevention Lifeline - 1 (800) 273-8255 24/7 on call suicidepreventionlifeline.org Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press 0 after hours 24/7 on call studenthealth.usc.edu/sexual-assault Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

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grams and training, the Provosts Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

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