

Economics of Collusion
ENCORE
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Course Description This course examines the coordination by firms of their prices and quantities for the purpose of raising profit. Collusion encompasses both hard-core price-fixing cartels and tacit collusion. The emphasis of the course is on developing theories of collusion towards understanding its implications for firm behavior. These theories are examined in light of actual collusive practices with the goal of constructing better theories and better policies. The lectures are organized according to the three primary tasks faced by a cartel: sustaining a collusive outcome, selecting a collusive outcome, and eluding detection.

Text Book Massimo Motta, *Competition Policy: Theory and Practice*, Cambridge: Cambridge University Press, 2004. [While only Chapter 4 will be used, this is a superb general reference on the theory and practice of competition policy; see my endorsement at www.iue.it/Personal/Motta/book.html]

Pre-requisites Students are assumed to be familiar with game theory (specifically, simultaneous-move games, repeated games, Nash equilibrium, and sub-game perfect equilibrium) and static oligopoly theory (Cournot/quantity and Bertrand/price games). All of this material is in Chapter 8 (Sections 3-4) of Motta (2004).

Background Reading

- Connor, John M., *Global Price Fixing: Our Customers are the Enemy*, Boston: Kluwer Academic Publishers, 2001. [It offers good case studies of citric acid, lysine, and vitamins which serve to give you a feel for how a price-fixing cartel operates. If you want to read just two chapters, I'd recommend Chapters 5 and 8.]
- Levenstein, Margaret C. and Valerie Y. Suslow, "What Determines Cartel Success?," U. of Massachusetts, 2004. [An excellent review of cross-section empirical studies.] <www-unix.oit.umass.edu/~maggie1/JEL-1-04.pdf>

Lectures Listed below are the papers that we will review in detail. As my lectures are self-contained, all assigned readings can be treated as optional. However, a careful reading of these papers is required if one is to see how results are proven and if one is to do research in this area.

- Sustaining collusion
 - Canonical mechanism
 - * Motta (2004), Chp. 4.1-4.2
 - Alternative mechanisms
 - * Motta (2004), Chp. 4.3.1-4.3.2
 - * Abreu, Dilip, “Extremal Equilibria of Oligopolistic Supergames,” *Journal of Economic Theory*, 39 (1986), 191-225. [This paper is a classic but is a bit dense; it is more for the student who is seriously interested in the underlying game theory.]
 - Monitoring and compliance
 - * Motta (2004), Chp. 4.3.3
 - * Porter, Robert H., “Optimal Cartel Trigger Price Strategies,” *Journal of Economic Theory*, 29 (1983), 313-338.
 - Multi-market interaction
 - * Bernheim, B. Douglas and Michael D. Whinston, “Multimarket Contact and Collusive Behavior,” *RAND Journal of Economics*, 21 (1990), 1-26. [We are likely not to get to this material but this is a paper well worth reading.]
- *Open Discussion*: Should the antitrust/competition authorities more actively prosecute tacit collusion?
 - Motta (2004), Chp. 4.4.1-4.4.2
- Selection of a collusive outcome
 - Harrington, Joseph E. Jr., “Collusion Among Asymmetric Firms: The Case of Different Discount Factors,” *International Journal of Industrial Organization*, 7 (1989), 289-307.

- Detection
 - Eluding detection
 - * Harrington, Joseph E. Jr., “Cartel Pricing Dynamics in the Presence of an Antitrust Authority,” Johns Hopkins University, 2003 (*RAND Journal of Economics*, forthcoming). <www.econ.jhu.edu/People/Harrington/wp487_harrington.pdf>
 - Distinguishing between collusion and competition
 - * Porter, Robert H. and J. Douglas Zona, “Detection of Bid Rigging in Procurement Auctions,” *Journal of Political Economy*, 101 (1993), 79-99.
- *Open Discussion*: Theoretical and policy challenges

Some recommended theory papers for future study

- Abreu, Dilip, David Pearce and Ennio Stacchetti, “Optimal Cartel Equilibria with Imperfect Monitoring,” *Journal of Economic Theory*, 39 (1986), 251-269.
- Aoyagi, Masaki, “Collusion in Dynamic Bertrand Oligopoly with Correlated Private Signals and Communication,” *Journal of Economic Theory*, 102 (2002), 229-248.
- Athey, Susan and Kyle Bagwell, “Optimal Collusion with Private Information,” *RAND Journal of Economics*, 32 (2001), 428-465.
- Bagwell, Kyle and Robert W. Staiger, “Collusion Over the Business Cycle,” *RAND Journal of Economics*, 28 (1997), 82-106.
- Benoît, Jean-Pierre and Vijay Krishna, “Dynamic Duopoly: Prices and Quantities,” *Review of Economic Studies*, 54 (1987), 23-35.
- Ferstman, Chaim and Ariel Pakes, “A Dynamic Oligopoly with Collusion and Price Wars,” *RAND Journal of Economics*, 31 (2000), 207-236.
- Haltiwanger, John and Joseph E. Harrington, Jr., “The Impact of Cyclical Demand Movements on Collusive Behavior,” *RAND Journal of Economics*, 22 (1991), 89-106.
- Harrington, Joseph E. Jr., “The Determination of Price and Output Quotas in a Heterogeneous Cartel,” *International Economic Review*, 32 (1991), 767-792.
- Rotemberg, Julio J. and Garth Saloner, “A Supergame-Theoretic Model of Price Wars During Booms,” *American Economic Review*, 76 (1986), 390-407.

- Staiger, Robert W. and Frank A. Wolak, “Collusive Pricing with Capacity Constraints in the Presence of Demand Uncertainty,” *RAND Journal of Economics*, 23 (1992), 203-220.
- Vasconcelos, Helder, “Tacit Collusion, Cost Asymmetries, and Mergers,” U. of Bocconi, 2003 (forthcoming, *RAND Journal of Economics*).

Some recommended empirical papers for future study

- Bajari, Patrick and Lixin Ye, “Deciding Between Competition and Collusion,” *Review of Economics and Statistics*, 85 (2003), 971-989.
- Baldwin, Laura H., Robert C. Marshall, and Jean-Francois Richard, “Bidder Collusion at Forest Service Timber Auctions,” *Journal of Political Economy*, 105 (1997), 657-699.
- Borenstein, Severin and Andrea Shepard, “Dynamic Pricing in Retail Gasoline Markets,” *RAND Journal of Economics*, 27 (1996), 429-451.
- Ellison, Glenn, “Theories of Cartel Stability and the Joint Executive Committee,” *RAND Journal of Economics*, 25 (1994), 37-57.
- Evans, William N. and Ioannis N. Kessides, “Living by the ‘Golden Rule’: Multimarket Contact in the U.S. Airline Industry,” *Quarterly Journal of Economics*, 109 (1994), 341-366.
- Genesove, David and Wallace P. Mullin, “Rules, Communication, and Collusion: Narrative Evidence from the Sugar Institute Case,” *American Economic Review*, 91 (2001), 379-398.
- Pesendorfer, Martin, “A Study of Collusion in First-Price Auctions,” *Review of Economic Studies*, 67 (2000), 381-411.
- Porter, Robert H., “A Study of Cartel Stability: The Joint Executive Committee, 1880-1886,” *Bell Journal of Economics*, 14 (1983), 301-314.
- Röller, Lars-Hendrik and Frode Steen, “On the Workings of a Cartel: Evidence from the Norwegian Cement Industry from 1955-1968,” February 2003.