

INDUSTRIAL ORGANIZATION

Industrial Organization (IO) economists study firm behavior and its consequences in settings where the assumptions of perfect competition do not hold; i.e., where we can no longer just think about the intersection of a demand and supply curve. Example topics include the pricing and marketing strategies individual firms can use to increase profits; the design of marketplaces (eBay, Uber, markets for wholesale electricity trading, health insurance exchanges); the effects of interactions between firms and problems that can arise if they coordinate on anti-competitive strategies; issues that arise when consumers behave sub-optimally (e.g., in consumer credit markets); and public policy responses to firm behavior, including antitrust laws and regulation, and sub-optimal consumer behavior. The primary tools of IO are consumer and producer theory, optimization (i.e., calculus) and especially game theory. Studying IO is an ideal lead-in to careers in antitrust/litigation or strategy consulting, marketing, corporate finance or corporate law, and public policy.

The aims of the course are to: (i) introduce you to the main issues in IO; (ii) show you how to think about how markets work in a systematic and logical way, which would help you in any kind of business or policy analysis role; (iii) teach you some interesting facts about markets you participate in (e.g., airline markets, health insurance, eBay). We will look at a range of empirical applications.

Assessment: you will be graded on a number of different activities:

- (a) weekly problem sets (35%, each one graded out of four). The two worst scoring problem set will be excluded from the calculation of the final grade. Point scores: 0=not handed in on time/no effort; 1=handed in, but poor; 2=handed in, acceptable; 3=handed in, good performance; 4=handed in, excellent. Note that 4 is reserved for truly excellent work (thorough, well-written, displaying excellent understanding of the material) and not simply getting the answers right. Problem sets are due on Wednesdays in-class or, at the time of start of class via ELMS.
- (b) class participation and a class presentation of an empirical paper (15%). Note that I expect you to attend and participate in class.¹ If you will have to miss more than a handful of classes, please discuss this with me in advance. For the class presentation, you both need to prepare the presentation and produce a one page handout for the class summarizing the main points in the paper (this will be distributed to everyone via ELMS). Note that the scoring system for problem sets means that you may choose to focus on your presentation/handout for the week that you are doing the presentation.
- (c) a midterm exam (20%).
- (d) a final exam (30%) (cumulative, but focused on the second-half). Exams are closed-book, but you will be given a helpful formulae sheet. Bring a calculator and an eraser.

¹ Note that we will do some in-class exercises. These will not count for the final grade, but may be collected so I have better information on who was present.

When calculating the final score for the class I will take the maximum of your score based on this point distribution and $(40 \cdot \text{PS scores} + 10 \cdot \text{class} + 50 \cdot \text{final exam} - 10)$ i.e., the midterm score can be dropped for the loss of 10 points, with the rest of the midterm weight going onto the final. If you fail to take the midterm (without meeting one of the rules laid down by the university that require a make-up) then this second formula will apply.

Note that when I reserve the right to use a curve when assigning letter grades. The median grade for 400 level Economics courses is a B-.

Pre-requisites: a C- or above in ECON 326 and one of ECON 321 and STAT 400. Familiarity with linear algebra, differentiation and basic game theory are required to do well in the course.

Academic Integrity: UMD students are expected to abide by the Honor Code, administered by the Student Honor Council. Please make yourself aware of the consequences of cheating, fabrication, and plagiarism.

Absences and Make-up Exams: Make-up exams will be granted only to those students whose excuse complies with University policy. The four valid excuses according to University policy are medical conditions, religious observances, participation in University events at the request of University authorities, and compelling circumstances beyond your control. If you believe you need a make-up, please inform me as far in advance as possible by email and I will set up a face-to-face meeting. You should be ready to provide appropriate documentation. See the assessment section for what happens if you miss the midterm without approval.

Students who need accommodation: If you need accommodation for exams, please contact me as soon as possible. Students registered who provide documentation from the University's Disability Support Services will always be accommodated.

Contact details: my office is Tydings 3135, telephone number 301-405-8325. My office hours are Tuesday 9:30-10:30, but I will usually also be available after class.

Website & email: Materials will be available on ELMS: <http://www.elms.umd.edu>. I expect students to check ELMS regularly. I will post important announcements on ELMS and send them by email. If you send an email to me, please include ECON 460 in the subject line so that I can keep track of them. If I do not respond within 24 hours during the week (48 hours at the weekend), then send me another email in case I missed it.

Materials: Lecture slides or handouts will be available prior to class. The theoretical material that I expect you to know will be on these slides/handouts. Papers/case materials that I expect you to know for exams will be clearly indicated.

Book: The 2013 class sampled a variety of textbooks. Their preferred one, which we will make use of this year, is:

Lynne Pepall, Dan Richards, George Norman, *Industrial Organization: Contemporary Theory and Empirical Applications*, 2014, Wiley, Fifth Edition (available in e-book format)

I am happy for people to use older editions of this textbook: where I can I will try to let you know where there are differences.

Other useful books are:

Jeffrey Church and Roger Ware, *Industrial Organization: A Strategic Approach*, 2000 which is now freely available online (an electronic copy will be posted). This book is long and detailed, but it was the standard textbook for undergraduate courses at Harvard, Stanford etc.

Cabral, Luis, *Industrial Organization: An Introduction*, 2000, MIT Press. A compact book that is well-regarded, but it is lacking math. A good book to introduce yourself to a topic and maybe the best one for pre-class reading.

Carlton, Dennis and Jeffrey Perloff, *Industrial Organization*, 4th edition, 2005. A good book for empirical examples and intuition.

Jean Tirole, *The Theory of Industrial Organization*, MIT, 1987. This book is highly recommended for anyone who wants to do further study in IO.

Paul Belleflamme and Martin Peitz, *Industrial Organization: Markets and Strategies*, Cambridge University Press, 2010. A nice Masters level textbook that is useful for theory developed after Tirole was published.

I will distribute some chapters from various editions of:

J Kwoka and L White (eds.), *The Antitrust Revolution*, Oxford University Press. This book covers different antitrust cases with the chapters usually written by someone who participated as an expert witness or consultant in the case. There are several volumes with different cases.

Michael Whinston, *Lectures on Antitrust Economics*, MIT, 2006. Excellent short book covering a small number of specific topics; I'll distribute some material from it.

OUTLINE

Conceptually the course can be divided into three parts. The first part will be a brief review of the basic monopoly pricing, key concepts from game theory and how to read empirical papers. Almost all of the theory should be familiar from intermediate micro, but you need to know it thoroughly as we will use it repeatedly. The second part can be thought of as studying the strategy choices of a monopolist. I mean this in a broad sense: for example, we will consider the design of an auction where there is a single seller but competing buyers (or, in a procurement setting, a single buyer and competing sellers). We will also consider regulation of monopoly, and settings where monopoly is desirable (for example, as the reward for an innovator). The final part considers settings where there is competition between firms. Here we will be interested both in modeling outcomes (for example, is more intense competition necessarily desirable when we endogenize the number of firms that compete in a market) and government policies (for example, should mergers be allowed? how can collusion be detected? Should we be concerned when incumbents respond to new entrants by setting very low prices?).

Textbook References by Topic

(note: references are for Pepall et al. (PRN) latest (5th) edition, Church and Ware (CW) and Cabral (LC))

Additional readings from journals will be posted on ELMS

Introduction and Examples

PRN 1, LC 1 & 3; CW 1, 2.1 & 3.4

Monopoly Pricing (and variants)

PRN 2.1, 16 & 17, LC 5.1 & 11; CW 2, 22

Game Theory

LC 4, CW 7 and 9

Vertical Pricing

PRN 16, LC 11

Price Discrimination

PRN 5, 6 & 8, LC 10; CW 5

Durable Good Pricing

PRN 2.3 & 2.4, CW 4.3

Advertising (Monopoly)

PRN 19, LC 13, CW 6.3, 17

Auctions

PRN 23

Adverse Selection, Moral Hazard & Insurance Markets

CW 6

R&D

PRN 20, 21; LC 16, CW 18

Sub-optimal Consumer Behavior

Class slides

Regulation of Monopolies

CW 24-26, LC 5.2-5.3

Quantity and Price Competition

PRN 9 & 10, LC 7; CW 8

Search

LC 12.4

Horizontal and Vertical Product Differentiation

PRN 10, LC 12; CW 11

Determinants of Market Structure

PRN 4, LC 14; CW 4.1, 8.2

Case studies from J Sutton, *Sunk Costs and Market Structure*

Mergers

PRN 15, LC 15.3, CW 23

M Whinston, *Lectures on Antitrust Economics*, chapter on horizontal mergers

Department of Justice and Federal Trade Commission (2010), *Horizontal Merger Guidelines*

Collusion

PRN 14, LC 8, CW

Strategic Firm Behavior (deterrence and predation)

PRN 12, LC 15, CW 13-16, 20-21

Papers for Class Presentation. More papers can/will be added; you can do presentations individually or in pairs as long as the paper is not too short; presentations should be between 7.5 and 15 minutes and focus on the main points: i.e., what is the main question?; what is the data?; what is the main hypothesis tested and how is it tested?; what is the paper's conclusion?; did you find the paper convincing, or did you think of alternative interpretations of the data, or a better place to test the theory?

Steve Puller and Lisa Taylor, "Price discrimination by day-of-week of purchase: Evidence from the U.S. airline industry", *Journal of Economic Behavior and Organization*, 2012

Phil Leslie, "Price Discrimination in Broadway Theater", *RAND Journal of Economics*, 2004

Ricard Gil, "Does Vertical Integration Decrease Prices? Evidence from the Paramount Antitrust Case of 1948", *American Economic Journal: Economic Policy*, 2015

Margaret Slade, "Beer and the Tie: Did Divestiture of Brewer-Owned Public Houses Lead to Higher Beer Prices?", *Economic Journal*, 1998

Tom Blake, Chris Nosko and Steve Tadelis, "Consumer Heterogeneity and Paid Search Effectiveness: A Large Scale Field Experiment", *Econometrica*, 2015

Wes Hartmann and Daniel Klapper, "Superbowl Ads", 2014

Seth Stephens-Davidowitz and Hal Varian, "Super Returns? The Effects of Ads on Product Demand", 2014

Liran Einav, Chiara Farronato, Jon Levin and Neel Sundareshan, "Sales Mechanisms in Online Markets: What Happened to Internet Auctions?", 2013

Mike Ostrovsky and Michael Schwarz, "Reserve Price in Internet Advertising Auctions: A Field Experiment", 2009

Eric Budish, Ben Roin and Heidi Williams, "Do Firms Underinvest in Long-Term Research? Evidence from Cancer Clinical Trials", *American Economic Review*, 2015

Stefano DellaVigna and Ulrike Malmendier, “Paying Not to Go to the Gym”, *American Economic Review*, 2006

Alan Sorenson, “Equilibrium Price Dispersion on Retail Markets for Prescription Drugs”, *Journal of Political Economy*, 2000

William Evans and Ioannis Kessides, “Living by the Golden Rule: Multimarket Contact in the US Airline Industry”, *Quarterly Journal of Economics*, 1994

Severin Borenstein, “Rapid Price Communication and Coordination: The Airline Tariff Publishing Case (1994)”, *Antitrust Revolution*, 2004

Nathan Miller, “Strategic Leniency and Cartel Enforcement”, *American Economic Review*, 2009

Orley Ashenfelter, Dan Hosken and Matt Weinberg, “The Price Effects of a Large Merger of Manufacturers: A Case Study of Maytag-Whirlpool”, *AEJ: Economic Policy*, 2013

Orley Ashenfelter, Dan Hosken and Matt Weinberg, “Efficiencies Bewed: Pricing and Consolidation in the US Beer Industry”, 2014

E. Han Kim and Vijay Singal, “Mergers and Market Power: Evidence from the Airline Industry”, *American Economic Review*, 1993

Austan Goolsbee and Chad Syverson, “How do Incumbents Respond to the Threat of Entry? Evidence from Major Airlines”, *Quarterly Journal of Economics*, 2008

Aaron Edlin and Joe Farrell, “The American Airlines Case: A Chance to Clarify Predation Policy”, *Antitrust Revolution*, 2004

Draft Schedule

Note: schedule subject to change

WK 1	8/31/15	Introduction; Review of Pricing and Welfare	9/2/15	Review of Game Theory and Empirics
WK 2	9/7/15	No class	9/9/15	Multi-product pricing; double marginalization and vertical pricing.
WK 3	9/14/15	Price discrimination	9/16/15	Price discrimination
WK 4	9/21/15	Durable good pricing	9/23/15	Advertising
WK 5	9/28/15	Auctions	9/30/15	Auction design
WK 6	10/5/15	Adverse selection and moral hazard	10/7/15	R&D and patents
WK 7	10/12/15	Sub-optimal consumer behavior	10/14/15	Sub-optimal consumer behavior
WK 8	10/19/15	Catch-up, in-class review	10/21/15	Midterm Exam
WK 9	10/26/15	Price and quantity competition	10/28/15	Search, endogenous entry
WK 10	11/2/15	Mergers	11/4/15	Mergers
WK 11	11/9/15	Mergers	11/11/15	Collusion
WK 12	11/16/15	Collusion	11/18/15	Collusion
WK 13	11/23/15	Entry deterrence and accomodation	11/25/15	Entry deterrence and accomodation
WK 14	11/30/15	Predation	12/2/15	Predation
WK 15	12/7/15	Catch-up	12/9/15	In-class review

Final Exam: Thursday, Dec 17, 1:30