

Applied Microeconomics: Digitized Economies

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Ever wonder how Uber surge pricing works? Want to understand the best strategy for winning an auction on Ebay? How does zero pricing work for Apps? This course will answer all of these questions and other aspects of applied microeconomics in a digitized world. We'll discover how economists answer these questions, and also how they are answering new questions about online labor markets, data markets, and e-commerce.

What you'll learn:

- How individuals make choices with constrained budgets, under uncertainty, and with various risk preferences.
- How firms make pricing decisions such as group, menu and bundling pricing, and the power of pricing at zero.
- How firms and individuals strategize in context:
 - Strategy (Intro to Game Theory)
 - Market Design (Auctions & Mechanism Design)
 - Reputation & Trust systems
 - Matching
 - Two-sided markets for platforms and online labor markets

Prereq: Grad Micro 1

Exams, problem sets, classroom performance, and grading:

Grading: Weekly Assignments 10%, Problem Sets 30%, 1 Exam 30%, 1 Final Project 30%. Bonus for in-class participation and/or attendance.

Weekly assignments:

Each week you will be required to submit a one page summary (no more than 500 words) of an article (out of the assigned options listed in the syllabus) that briefly discusses the main point of the paper and connects at least two concepts discussed in the required readings or from class that week. During "Part III: Application in the Digital World," the weekly assignment should relate to concepts discussed from all of the previous weeks. The course is designed cumulatively so that you can connect previous concepts and relate them to recent research.

Problem Sets:

This course will require 4 problem sets that are due in class and will be discussed in recitation. The problem sets normally have two parts: one covering more technical problems out of the textbook and class lectures, and the other covering applications based on the assigned reading and class discussion. Late problem sets will not be accepted, but given that life circumstances may come up, I will drop the lowest grade of your problem sets from the average of your problem set portion of your grade.

Final Project:

You will have an option to choose 1 out of 3 case problems of which you will create a market design for a particular case. You also have the option to build your own market design. You will present your market design in class and submit a paper describing the context and solution.

Syllabus

Week	Topics		Assign.
Part I: Consumer, Producers & Basic Strategy			
1	Review	Firms, Consumers and the Market	
	Consumers	Revealed preference	
2		Choice under uncertainty and risk	
		Search & Switching Costs	
3	Producers	Pricing & Markets	PSet 1
		Group, Menu Pricing	
4		Bundling	
		Pricing at zero	
5	Networks	Network goods & markets	PSet 2
		Network goods & monopolies	
6	Game Theory	Nash Equilibrium	
		Strategy under perfect information	
7	Game Theory & Network Externalities	Information & Strategy	
		Adverse Selection, Signaling & Screening	
8		Catch-up	
		Midterm Exam	Midterm
Part II: Market Design			
9	Auctions	Auctions	
		Practical Auction Design	
10		Mechanism Design	
	Market Design	Information	PSet 3
11		Reputation & Trust	
	Matching	Matching Theory	
12	Two-sided markets	Two-sided markets	
		Strategy in two-sided markets	
Part III: Application in the Digital World			
13	Online Labor Markets	Labor, matching & reputation	PSet 4
		Wage rates & online labor	
14	E-commerce Markets	Video games	
		Music	
15	Data Markets	Impact of Big Data on firms	
		Data Markets	
16	Final Project Presentations: Applied Market Design		Final Project

Readings

Textbooks:

- [J&R] Geoffrey Jehle & Philip Reny, **Advanced Microeconomic Theory, 3rd ed.**, Prentice Hall, 2011.
- [B&P] Belleflamme, P., & Peitz, M. (2015). **Industrial organization: markets and strategies.** Cambridge University Press.

Other Useful textbooks:

- Hal Varian, *Microeconomic Analysis*, 3rd ed., Norton, 1992.
- Gibbons, Robert, *Game Theory for Applied Economists*, New Jersey: Princeton University Press, 1992. (Also in paperback.)
- Varian, H and Shapiro, C. *Information Rules: A Strategic Guide to the Network Economy*
- Varian, Ferrell, Shapiro. *The Economics of Information*
- Vulkan, Roth, and Neeman. *The Handbook of Market Design*

Week 1: Review & Consumers

Required:

- Chapter 2: B&P
- Chapter 2.1-2.3: J&R

Weekly Reading (Choose 1)

- Roth, Alvin E. (2002): "The Economist as Engineer: Game Theory, Experimentation, and Computation as Tools for Design Economics." *Econometrica*, 70(4), 1341-1378.
- Sah, Raj (1987): "Queues, Rations, and Market: Comparisons of Outcomes for the Poor and the Rich." *American Economic Review*, 77, 69-77.
- Wallsten, S. (2015). What are we not doing when we are online?. In *Economic Analysis of the Digital Economy* (pp. 55-82). University of Chicago Press.
- Zervas, G., Proserpio, D., & Byers, J. W. (2017). The rise of the sharing economy: Estimating the impact of Airbnb on the hotel industry. *Journal of marketing research*, 54(5), 687-705.

Week 2: Consumers

Required:

- Chapter 2.4: J&R
- Chapter 7: B&P

Weekly Reading (Choose 1)

- Honka, E. (2014). Quantifying search and switching costs in the US auto insurance industry. *The RAND Journal of Economics*, 45(4), 847-884.
- Sorkin, I. (2018). Ranking firms using revealed preference. *The Quarterly Journal of Economics*, 133(3), 1331-1393.
- Che, Y., I. Gale, and J. Kim (2013): "Allocating Resources to Budget-Constrained Agents." *Review of Economic Studies*, 80, 73-107.

Week 3: Producers

Required:

- Chapter 4: J&R
- Chapters 8 & 9: B&P

Weekly Reading (Choose 1)

- Fudenberg, D. and Villas-Boas, J.M. (2012). Price Discrimination in the Digital Economy. *The Oxford handbook of the digital economy*. Oxford University Press.

- Choi, J. P. (2012). Bundling information goods. *The Oxford handbook of the digital economy*, 273-305.
- Calvano, E., Calzolari, G., Denicolò, V., & Pastorello, S. (2018). Artificial intelligence, algorithmic pricing and collusion.

Week 4: Producers

Required:

- Chapter 11: B&P
- Parker, Geoffrey, and Marshall W. Van Alstyne. "Two-Sided Network Effects: A Theory of Information Product Design." *Management Science* 51, no. 10 (2005): 1494-1504.

Weekly Reading (Choose 1)

- Shambanier, K., Mazar, N., & Ariely, D. (2007). Zero as a special price: The true value of free products. *Marketing science*, 26(6), 742-757.
- Ajorlou, A., Jadbabaie, A., & Kakhbod, A. (2016). Dynamic pricing in social networks: The word-of-mouth effect. *Management Science*, 64(2), 971-979.
- Lee, R. S., & Wu, T. (2009). Subsidizing creativity through network design: Zero-pricing and net neutrality. *Journal of Economic Perspectives*, 23(3), 61-76.

Week 5: Networks

Required:

- Chapter 20.1: B&P
- Chapter 20.2-20.3: B&P

Weekly Reading (Choose 1)

- Decarolis, F., & Rovigatti, G. (2019). From Mad Men to Maths Men: Concentration and Buyer Power in Online Advertising.
- David, Paul E. "Clio and the Economics of QWERTY," *American Economic Review*, 75(2), 1985, 332 – 337
- Björkegren, D. (2018). The adoption of network goods: evidence from the spread of mobile phones in Rwanda. *The Review of Economic Studies*, 86(3), 1033-1060.
- Edelman, Benjamin, and Ian I. Larkin. "eBay Partner Network (A)." Harvard Business School Case. Boston, MA: Harvard Business School Publishing. Case: 910008, August 11, 2010.

Week 6: Game Theory

Required:

- Chapter 7.1-7.2: J&R
- Chapter 7.3: J&R

Weekly Reading (Choose 1)

- Brandenburger, Adam, and Vijay Krishna. "The Gray Area: Common Sense 0, Strategic Reasoning 6." *Harvard Business Review* 90, no. 4: 200-201.
- Reinganum, J. F. (1985). Innovation and industry evolution. *The Quarterly Journal of Economics*, 100(1), 81-99.
- Reinganum, J. F. (1983). Uncertain innovation and the persistence of monopoly. *The American Economic Review*, 73(4), 741-748.

Week 7: Game Theory & Network Externalities

Required:

- Chapter 21: B&P
- Chapter 8.1: J&R

Weekly Reading (Choose 1)

- Njoroge, P., Ozdaglar, A., Stier-Moses, N. E., & Weintraub, G. Y. (2013). Investment in two-sided markets and the net neutrality debate. *Review of Network Economics*, 12(4), 355-402.
- Liu, M., Brynjolfsson, E., & Dowlatabadi, J. (2018). Do Digital Platforms Reduce Moral Hazard? The Case of Taxis and Uber.
- McIntyre, D. P., & Srinivasan, A. (2017). Networks, platforms, and strategy: Emerging views and next steps. *Strategic Management Journal*, 38(1), 141-160.

Week 8: Midterm

Week 9: Auctions

Required:

- Chapter 9.1-9.3: J&R
- Chapter 3, Klemperer, Paul (2004): Auctions: Theory and Practice. Toulouse Lectures, Princeton University Press.

Weekly Reading (Choose 1)

- Cramton, P. (1998). The efficiency of the FCC spectrum auctions. *The Journal of Law and Economics*, 41(S2), 727-736.
- Crandall, R. W. (1998). New Zealand spectrum policy: A model for the United States?. *The Journal of Law and Economics*, 41(S2), 821-840.
- Roth, A. E., & Ockenfels, A. (2002). Last-minute bidding and the rules for ending second-price auctions: Evidence from eBay and Amazon auctions on the Internet. *American economic review*, 92(4), 1093-1103.

Week 10: Market Design

Required:

- Chapter 9.4-9.5: J&R
- Chapter 23: B&P

Weekly Reading (Choose 1)

- Davidson, S., De Filippi, P., & Potts, J. (2016). Economics of blockchain. Available at SSRN 2744751.
- Yan, J., Yu, W., & Zhao, J. L. (2015). How signaling and search costs affect information asymmetry in P2P lending: the economics of big data. *Financial Innovation*, 1(1), 19.

Week 11: Market Design

Required:

- Chapter 23: B&P
- Chapter 9, Haeringer, G. (2018). Market design: auctions and matching. MIT Press.

Weekly Reading (Choose 1)

- Barach, M. A., Golden, J. M., & Horton, J. J. (2019). Steering in online markets: the role of platform incentives and credibility (No. w25917). National Bureau of Economic Research
- Roth, Alvin E. (1984): "The Evolution of the Labor Market for Medical Interns and Residents: A Case Study in Game Theory." *Journal of Political Economy*, 92: 991-1016.
- Abdulkadiroğlu, A., Pathak, P. A., & Roth, A. E. (2009). Strategy-proofness versus efficiency in matching with indifferences: Redesigning the NYC high school match. *American Economic Review*, 99(5), 1954-78.

Week 12: Two-sided markets

Required:

- Rochet, J. C., & Tirole, J. (2004). Two-sided markets: an overview. *Institut d'Economie Industrielle working paper*.

- Eisenmann, Thomas, Geoffrey Parker, and Marshall W. Van Alstyne. "Strategies for Two-Sided Markets." *Harvard Business Review Magazine*, October 2006.

Weekly Reading (Choose 1)

- Liu, T., Wan, Z., & Yang, C. (2019). The efficiency of a dynamic decentralized two-sided matching market. Available at SSRN 3339394.
- Roth, Alvin E. (1984): "The Evolution of the Labor Market for Medical Interns and Residents: A Case Study in Game Theory." *Journal of Political Economy*, 92: 991-1016.
- Castillo, J. C., Knoepfle, D., & Weyl, G. (2017, June). Surge pricing solves the wild goose chase. In *Proceedings of the 2017 ACM Conference on Economics and Computation* (pp. 241-242). ACM.
- Rochet, J. C., & Tirole, J. (2003). Platform competition in two-sided markets. *Journal of the european economic association*, 1(4), 990-1029.

Week 13: Online Labor Markets

Required:

- Agrawal, A., Horton, J., Lacetera, N., & Lyons, E. (2015). Digitization and the contract labor market: A research agenda. In *Economic analysis of the digital economy* (pp. 219-250). University of Chicago Press.
- Benson, A., Sojourner, A., & Umyarov, A. (2019). Can Reputation Discipline the Gig Economy?: Experimental Evidence From an Online Labor Market. *Benson, Alan, Aaron Sojourner, and Akhmed Umyarov.*

Weekly Reading (Choose 1)

- Hall, J. V., Horton, J. J., & Knoepfle, D. T. (2019). Pricing Efficiently in Designed Markets: The Case of Ride-Sharing.
- Horton, J. J. (2010, December). Online labor markets. In *International workshop on internet and network economics* (pp. 515-522). Springer, Berlin, Heidelberg.
- Cook, C., Diamond, R., Hall, J., List, J. A., & Oyer, P. (2018). *The gender earnings gap in the gig economy: Evidence from over a million rideshare drivers* (No. w24732). National Bureau of Economic Research.
- Horton, J. J. (2019). Buyer uncertainty about seller capacity: Causes, consequences, and a partial solution. *Management Science*.

Week 14: E-commerce Markets

Required:

- Liu, H. (2010). Dynamics of pricing in the video game console market: skimming or penetration?. *Journal of marketing research*, 47(3), 428-443.
- Shiller, B., & Waldfogel, J. (2011). Music for a song: an empirical look at uniform pricing and its alternatives. *The Journal of Industrial Economics*, 59(4), 630-660

Weekly Reading (Choose 1)

- MacQuarrie, B., & Zhu, K. (2003). Economics of Digital Bundling: The Impacts of Digitization on the Music Industry. *Communications of the Association for Computing Machinery (CACM)*, 46(9), 264-270.
- De los Santos, B., O'Brien, D. P., & Wildenbeest, M. R. (2018). Agency Pricing and Bargaining: Evidence from the E-Book Market. *Kelley School of Business Research Paper*, (18-90).
- Lucking-Reiley, D. (2000). Auctions on the Internet: What's being auctioned, and how?. *The journal of industrial economics*, 48(3), 227-252.
- Houser, D., & Wooders, J. (2006). Reputation in auctions: Theory, and evidence from eBay. *Journal of Economics & Management Strategy*, 15(2), 353-369.

- Corts, K. S., & Lederman, M. (2009). Software exclusivity and the scope of indirect network effects in the US home video game market. *international Journal of industrial Organization*, 27(2), 121-136.

Week 15: Data Markets

Required:

- Bajari, P., Chernozhukov, V., Hortaçsu, A., & Suzuki, J. (2019, May). The impact of big data on firm performance: An empirical investigation. In *AEA Papers and Proceedings* (Vol. 109, pp. 33-37).
- Jin Y, & Vasserman S. Buying Data from Consumers: The Impact of Monitoring in US Auto Insurance. Working Paper.

Weekly Reading (Choose 1)

- Ramadorai, T., Walther, A., & Uettwiller, A. (2019). The Market for Data Privacy.
- Admati, A. R., & Pfleiderer, P. (1986). A monopolistic market for information. *Journal of Economic Theory*, 39(2), 400-438.
- Agarwal, A., Dahleh, M., & Sarkar, T. (2019, June). A marketplace for data: An algorithmic solution. In *Proceedings of the 2019 ACM Conference on Economics and Computation* (pp. 701-726). ACM.