

SC-MKTG Interface

26:799:685

Fall 2017

Wed 10-12:50PM (WP202)

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Office Hours: before/after class

COURSE DESCRIPTION

This course covers probabilistic and recursive economic models and their applications in price theory, distribution channel management, supply chain management and revenue management from a risk analysis perspective. The managerial focus is on place (distribution), price and promotion of the 4Ps under both operational and marketing environments. The course introduces essential demand and supply theories and analytical/empirical modeling techniques to doctoral students, bring them to the research frontier on the SC-MKTG interfaces and grant them ability to publish on both operations management and marketing journals. All data analysis is implemented with R-studio.

COURSE MATERIALS

No formal textbook is required. The course is based on lecture notes and academic journal papers. Students develop research skills and knowledge through the following course activities and assignments:

- In-class lectures and discussions
- Homework
- Paper presentation
- Final exam

PREQUISITES

Basic optimization techniques, elementary probability theory and introductory microeconomics. There are two related courses: 26:799:675 Marketing Models, and 26:799:685 Supply Chain Inventory Models.

ACADEMIC INTEGRITY

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research and other educational and scholarly activities. All suspected incidents of academic

misconduct will be referred to an Academic Integrity Facilitator for investigation. Unfortunately, some Rutgers students are failed or suspended every year for violations of academic integrity. If you have any doubt what constitutes a violation of academic integrity, please visit the Student Judicial Affairs website <http://academicintegrity.rutgers.edu/>

Cheating is not tolerated at Rutgers University. Students are responsible for understanding the RU Academic Integrity Policy at: https://slwordpress.rutgers.edu/academicintegrity/wp-content/uploads/sites/41/2014/11/AI_Policy_2013.pdf This Policy is strongly enforced. On all examinations and assignments, students must sign the RU Honor Pledge, which states, “On my honor, I have neither received nor given any unauthorized assistance on this examination or assignment.” Written assignments will be screened through *SafeAssign* or *Turnitin*, plagiarism detection services that compare the work against a large database of past work. Don’t let cheating destroy your hard-earned opportunity to learn. For more details see: business.rutgers.edu/ai

ATTENDANCE AND CLASS PREPARATION POLICY

Class participation is necessary. Students are required to discuss lecture materials in class. Continuing, thoughtful and thorough participation in all aspects of the class will enable students to maximize their benefit from this course. Some ground rules include:

- This class requires that you bring a laptop (with R-studio) in some sessions.
- Attend with an open mind – seek to learn.
- Engage in class discussions – focus on substance/quality.
- Keep your cell phone in silence.
- Please email the professor in advance, if you will be absent, late, or have to leave early.

For weather emergencies, consult the campus home page. If the campus is open, class will be held.

HOMEWORK

Exercise problems will be given throughout the semester. Even though students do not need to hand in their work, they are encouraged to try the problems first and then discuss solutions in-class.

PRESENTATION

Depending on enrollment, each team (with at most 2 students) will select two journal papers and give a formal lecture based on each paper. In the lecture, you need to explain the research problem, the motivation, the model, and the solution to the problem. You also need to compare the paper to existing work and point out the contribution. Feel free to take your time to clearly explain the paper.

Besides the presenters, the rest of the class will serve as discussants. The main task of a discussant is to provide a critique of the paper presented: the significance of the problem, the suitability of the model, the limitations of modeling assumptions, the role that these assumptions play in obtaining results, and possible extensions. In addition, discussants should look for common themes or key issues that link related papers and enhance our understanding of the topic. Lastly, discussants are expected to raise challenging questions that would guide class discussion.

The presentation will be graded based on how well you motivate the research and how clearly you explain the model and results. . See the journal paper list in the course schedule.

EXAM

One in-class final exam is held on Dec 13. Exam questions are related to class materials and exercise problems. Understanding lecture notes and papers and solving the exercise problems are essential for passing the course.

GRADING POLICY

Each component will be accounted for a percentage weighed toward your numerical course grade (max 100 pts) as follows:

Participation	20%
Presentation	30%
Exam	50%

No excuses will be accepted after I release the letter grade.

SUPPORT SERVICES

If you need accommodation for a *disability*, obtain a Letter of Accommodation from the Office of Disability Services. The Office of Disability Services at Rutgers, The State University of New Jersey, provides student-centered and student-inclusive programming in compliance with the Americans with Disabilities Act of 1990, the Americans with Disabilities Act Amendments of 2008, Section 504 of the Rehabilitation Act of 1973, Section 508 of the Rehabilitation Act of 1998, and the New Jersey Law Against Discrimination: <https://ods.rutgers.edu>

If you are a military *veteran* or are on active military duty, you can obtain support through the Office of Veteran and Military Programs and Services: <http://veterans.rutgers.edu/>

If you are in need of *legal services*, please use our readily available services: <http://rusls.rutgers.edu/>

COMMUNICATION WITH YOUR INSTRUCTOR

Email is the best way to communicate with your instructor. When sending email to your instructor, please sign your message with your first and last name.

Please use your rutgers.edu email whenever possible and put 26:799:685 in the subject line. Emails with no subject line or an unidentifiable name may be deleted as a protection against computer viruses.

TOPICS (tentative)

Books:

[BM] Peter Leeflang, Dick Wittink, Michel Wedel, Philippe Naert, Building Models for Marketing Decisions. Kluwer, 2000.

[SP] Sheldon Ross, Stochastic Processes. Wiley, 1996.

R language references:

Paul Teetor, R-Cookbook. O'Reilly, 2011.

Hadley Wickham, ggplot2. Springer, 2016.

0. Modeling Principles and History of Probability Studies (1 week)

- Chapters 1-8 of BM
- Little, J.D.C. 1970. Models and managers: The concept of a decision calculus. Management Science 16 B466-485.
- Little, J.D.C. 2004. Comments on “Models and managers: The concept of a decision calculus”. Management Science 50(12) 1854-1860.
- Gigerenzer, G., et al. 1990. Empire of Chance: How Probability Changed Science and Everyday Life, Cambridge University Press, New York.

1. Probability theory and applications in decision and risk analysis (4 weeks)

- Chapter 1 of SP
- Uncertainty and decision making (utility theory, risk aversion, prudence)
- Kahneman, D. 2011. Thinking, Fast and Slow. Farrar, Straus and Giroux, New York.
- Kimball, M. 1990. Precautionary saving in the small and in the large. Econometrica 58(1) 53-73.
- Back, K.E. 2010. Asset Pricing and Portfolio Choice Theory. Oxford University Press, New York.
- Applications in asset pricing theory (stochastic discount factors, B-S option pricing formula, mean-variance analysis)
- Cochrane, J.H. 2005. Asset Pricing. Princeton University Press, NJ.

2. Demand theory and profit maximization from a failure rate perspective (1 week)

- Chapter 9 of SP
- Chapters 9-10 of BM
- Barlow, R.E., F Proschan. 1965. *Mathematical Theory of Reliability*. SIAM.
- Lariviere, M.A. 2006. A note on probability distributions with increasing generalized failure rates. *Operations Research* 54(3) 602-604.
- Muller, A., D. Stoyan. 2002. *Comparison Methods for Stochastic Models and Risks*. John Wiley & Sons, West Sussex, England.
- Nagle, T.T., J.E. Hogan, J. Zale. 2011. *The Strategy and Tactics of Pricing*. Prentice Hall.
- Shaked, M., J.G. Shanthikumar. 2007. *Stochastic Orders*. Springer, New York.
- Topkis, D.M. 1998. *Supermodularity and Complementarity*. Princeton University Press, New Jersey.
- Mela, C.F., J. Roos, Y. Deng. 2013. A keyword history of Marketing Science. *Marketing Science* 32(1) 8-18.
- Tellis, G.J. 1988. The price elasticity of selective demand: A meta-analysis of econometric models of sales. *Journal of Marketing Research* 25(Nov) 331-341.
- Xu, X. 2009. Optimal price and product quality decisions in a distribution channel. *Management Science* 55(8) 1347-1352.

3. Poisson Processes, Markov chains and control theory (1 week)

- Chapters 2 and 4 of SP
- Puterman, M.L. 2005. *Markov Decision Processes*. John Wiley & Sons, Hoboken, NJ.

4. Dynamic Pricing with fixed capacity/inventory - Theory (2 weeks)

- Gallego, G., G. van Ryzin. 1994. Optimal dynamic pricing of inventories with stochastic demand over finite horizons. *Management Science* 40(8) 999-1020.
- McAfee, R.P., V. te Velde. 2008. Dynamic pricing with constant demand elasticity. *Production and Operations Management* 17(4) 432-438.
- Talluri, K.T., G. van Ryzin. 2004. *The Theory and Practice of Revenue Management*. Kluwer Academic Publishers, Boston.
- Xu, X., W.J. Hopp. 2006. A monopolistic and oligopolistic stochastic flow revenue management model. *Operations Research* 54(6) 1098-1109.
- Xu, X., W.J. Hopp. 2009. Price trends in a dynamic pricing model with heterogeneous customers: A martingale perspective. *Operations Research* 57(5) 1298-1302.
- Zhao, W., Y.S. Zheng. 2000. Optimal dynamic pricing for perishable assets with nonhomogeneous demand. *Management Science* 46(3) 375-388.
- Zhan, P., B. Oded, M. Hu. 2015. *Up then down: Bid-price trends in revenue management*. *Production and Operations Management* 24(7) 1135-1147. (Presenters:)

5. Dynamic Pricing with fixed capacity/inventory – Empirical evidence (2 weeks)

- McAfee, R.P., V. te Velde. 2006. Dynamic pricing in the airline industry, in Handbook on Economics and Information Systems, vol.1, edited by T. J. Hendershott, 527-567. Amsterdam: Elsevier.
- Abrate, G., G. Fraquelli, G. Viglia. 2012. Dynamic pricing strategies: Evidence from European hotels. *International Journal of Hospitality Management* 31(March) 160-168.
- Xu, X., W. Hopp, J. Drayer. 2017. Dynamic ticket pricing based on team performance: Theory and evidence. Working paper.
- Li, J., N. Granados, S. Netessine. 2014. *Are consumers strategic? Structural estimation from the air-travel industry. Management Science* 60(9) 2114-2137. (Presenters:)
- Mantin, B., E. Rubin. 2016. *Fare prediction websites and transaction prices: Empirical evidence from the airline industry. Marketing Science* 35(4) 640-655. (Presenters:)

6. Pricing, double marginalization and externality in a manufacturer-retailer distribution channel/ supply chain (1-2 weeks)

- Jeuland, A., S. Shugan. 1983. Managing channel profits. *Marketing Science* 2(3) 239-272.
- Lariviere, M.A., E.L. Porteus. 2001. Selling to the newsvendor: An analysis of price-only contracts. *MSOM* 3 293-305.
- Nobel, P.M., T.S. Gruca. 1999. Industrial pricing: Theory and managerial practice. *Marketing Science* 18(3) 435-454.
- Petruzzi, N.C., M. Dada. 1999. Pricing and the newsvendor problem: A review with extensions. *Operations Research* 47(2) 183-194.
- Salanie, B. 2005. *The Economics of Contracts: A Primer*. The MIT Press.
- Myerson, R.B. *Game Theory*. Harvard University Press, 1991.

7. Final Exam (1 week)