

Operations Management Summer Camp 2015

Date: Friday, 14 August 2015

Venue: Singapore Management University
Lee Kong Chian School of Business
Level 2, Seminar Room 2.1

Programme

8.15am - 8.30am

Registration

8.30am - 8.45am

Introduction and Welcome Remarks

8.45am - 9.45am

Paper 1

Presenter: Daniel ZHENG Zhichao, SMU

Discussant: Oguzhan ALAGOZ, University of Wisconsin-Madison

Title: Optimizing Colorectal Cancer Screening Policies Using A Combination of Fecal Occult Blood Test and Colonoscopy

Abstract:

Over the years, various countries have adopted a combination of fecal occult blood test (FOBT) and colonoscopy as the preferred protocol for colorectal cancer (CRC) screening and surveillance. Current guidelines recommend three consecutive FOBTs annually after age 50 and immediate colonoscopy if there is at least one positive outcome from the three FOBTs regardless of other factors or screening history. The guidelines have not been followed closely in practice, however, and patient compliance with this recommendation is very low. Furthermore, it is unclear from literature about the values of having the FOBT as a prescreening method before colonoscopy, and there is still related debate going on in practice. We propose a finite-horizon, partially observable Markov decision process (POMDP) model to optimize the CRC screening policy that combines FOBT and colonoscopy. Our model incorporates information from prior screening history and individual risk factors, including age, body condition, lifestyle, etc. Compared to the screening protocol that uses colonoscopy alone,

	<p>we demonstrate that when FOBT sensitivity is not too low, adding annual FOBTs can help identify CRC in a timely manner and increase expected total quality-adjusted life years (TQALYs), while at the same time significantly reduce the number of colonoscopies required. Compared to the current guidelines, the proposed screening protocol increases expected TQALYs, and reduces lifetime risk of developing CRC when the disutility of colonoscopy is not too high.</p>
<p>9.45am - 10.15am</p>	<p>Tea Break @ Catering area 2A/2B, near SR 2.8, Level 2</p>
<p>10.15am - 11.15am</p>	<p>Paper 2</p> <p>Presenter: Helen ZHOU Yangfang, SMU Discussant: Serguei NETESSINE, INSEAD</p> <p>Title: Corn or Soybean? Dynamic Farmland Allocation under Uncertainty</p> <p><u>Abstract:</u> This paper studies the farmland allocation decision of a farmer between two crops in a multi-period framework. In each growing period, the farmer chooses the allocation in the presence of revenue uncertainty, and crop rotation benefits across periods, i.e. revenue is stochastically larger when a crop is planted in a rotated land (where the other crop was planted in the previous period). We identify two strategies, monoculture, i.e. fully allocate the farmland to one of the crops, and rotate, i.e. plant each crop in the rotated farmland, which characterize the optimal allocation decision in each period. Our analysis provides rules of thumb for the impact of revenue uncertainty: The farmer benefits from a lower revenue correlation between the two crops. Interestingly, the farmer benefits from a higher revenue volatility only when this volatility is sufficiently high; otherwise, a lower revenue volatility increases the profitability. We propose a heuristic allocation policy which we characterize in closed form. Using a calibration based on a typical farmer planting corn and soybean in Iowa, we show that the proposed policy is near-optimal, and outperforms the commonly used heuristic allocation policies in practice (such as the myopic policy, always-rotate policy and monoculture policy).</p>
<p>11.15am - 12.15pm</p>	<p>Paper 3</p> <p>Presenter: Rowan WANG Yu, SMU Discussant: Dorothee HONHON, University of Texas at Dallas</p> <p>Title: When to Offer Upgrades?</p> <p><u>Abstract:</u> We consider a firm that sells multiple product models corresponding to multiple classes of demand. The firm may offer customers free upgrade to a more expensive model when there is insufficient stock of the one preferred. However, customers may not accept the upgrade due to their preference on features of the</p>

desired model. For example, a customer may have a strong preference for a cheaper cell phone model due to size and weight concerns; and a driver may prefer a compact rental car to a midsize one because of fuel saving. It is interesting to see that, knowing some customers may reject the upgrade option, it might be optimal to offer upgrade earlier and before stockout. This is different from the literature on stockout substitution where it is optimal to offer upgrade only after stockout assuming all customers will accept upgrades.

12.15pm - 1.30pm

Lunch @ Catering area 2A/2B, near SR 2.8, Level 2

1.30pm - 2.30pm

Paper 4

Presenter: Kwan Eng WEE, SMU

Discussant: Panos KOUVELIS, Washington University in St Louis

Title: Optimal price discounting in distribution channels with bargain-hunting consumers

Abstract:

We study optimal price discounting in distribution channels in a market characterized by bargain-hunting consumers, and we comparatively analyze the effects of retailer vs. manufacturer suggested retail pricing in that context. Accordingly, we develop a consumer utility function theoretically rooted in the empirically valid notion of transaction utility, and we incorporate that utility model into the framework of a firm's profit maximization model with promotional discounting effects to probe and to synthesize three related lines of inquiry. In particular, we formulate and solve the optimal discounting and final retail price for a centralized distribution channel and compare the results to the observed market practice to assess the utility function we constructed. Then, to assess the effects of decentralization and double marginalization on the optimal pricing strategy, we complete a parallel analysis for the analogous decentralized channel in which a manufacturer sets a wholesale price and sells to the price and discount-setting retailer, i.e., retailer suggested retail pricing. And then we leverage that analysis by comparing and contrasting the retailer suggested retail pricing variation of the decentralized channel to the manufacturer suggested retail pricing variation to assess the value of pricing rights within the distribution channel and how the allocation of those rights affects the optimal pricing strategy. Furthermore, we examine the above scenarios with the consideration of market uncertainty and assess the effects of market uncertainty on the pricing strategy in the centralized system, in the decentralized system with retailer suggested retail price, and in the decentralized system.

<p>2.30pm - 3.30pm</p>	<p>Paper 5</p> <p>Presenter: Buket AVCI, SMU</p> <p>Discussant: Albert HA, Hong Kong University of Science and Technology</p> <p>Title: Optimal Staffing with Endogenous Goals</p> <p><u>Abstract:</u></p> <p>We investigate the optimal staffing level decision of a firm, when employee motivation and performance are indirectly affected by staffing levels through workload. Employees control performance by exerting effort. Agents' effort level decisions are anchored on endogenous goals, implicitly determined by the staffing level. In the spirit of Prospect Theory, we posit that goals act as reference points, and there is an asymmetry between under and over-performance relative to a goal. We solve the corresponding principal-agent model and characterize conditions when endogenous goals are relevant for staffing decisions. Depending on contract parameters, the optimal staffing policy is either to limit headcount in a way that extracts maximum potential from each employee, or mass employment. We also provide managerial prescriptions for structuring performance pay contracts based on agents' risk profiles.</p>
<p>3.30pm - 3.45pm</p>	<p>Concluding Remarks</p>
<p>3.45pm - 4.30pm</p>	<p>Networking and Refreshments @ Catering area 2A/2B, near SR 2.8, Level 2</p>

Discussants' Profile:

Oguzhan ALAGOZ is currently an Associate Professor of Industrial and Systems Engineering at the University of Wisconsin-Madison. He received his BS from Bilkent University in 1997, MS from Middle East Technical University in 2000, and PhD in industrial engineering from the University of Pittsburgh in 2004. He worked as a visiting assistant professor of Operations at the Weatherhead School of Management of Case Western Reserve University between 2004 and 2005. His research interests include stochastic optimization, medical decision making, completely and partially observable Markov decision processes, simulation, risk-prediction modeling, health technology assessment, and scheduling. He is on the editorial boards of *Operations Research*, *IIE Transactions*, *Medical Decision Making* and *IIE Transactions on Healthcare Engineering*. He has received various awards including a CAREER award from National Science Foundation (NSF), outstanding young industrial engineer in education award from IIE, Dantzig Dissertation Honorable Mention Award from INFORMS, 2nd place award from INFORMS Junior Faculty Interest Group best paper competition, best paper award from INFORMS Service Science Section, and best poster award from UW Carbone Comprehensive Cancer Center. He has been the principal investigator and co-investigator on grants more than \$3 million funded by NSF and the National Cancer Institute of NIH.

Albert Y. HA is Wei Lun Foundation Professor of Business and Chair Professor at the Department of Information Systems, Business Statistics and Operations Management (ISOM) at the Hong Kong University of Science and Technology (HKUST). He received his B.Sc. degree in Civil Engineering from the University of Hong Kong, MBA degree from the Chinese University of Hong Kong and Ph.D. degree in Business from the Graduate School of Business of Stanford University. Prior to joining HKUST, Professor Ha has served on the faculty of the School of Management at Yale University for ten years.

Professor Ha's research interests are in the areas of Supply Chain Management and Economics of Queuing Systems. He has published in major academic journals such as Management Science, Operations Research and Naval Research Logistics. He currently serves as a Department Editor of Production and Operations Management as well as an Associate Editor of Management Science, Operations Research and Manufacturing and Service Operations Management.

Dorothee Honhon is an Associate Professor of Operations Management at the Jindal School of Management of the University of Texas at Dallas. Prior to this position, she worked at the McCombs School of Business of the University of Texas at Austin (2006-2011) and the Eindhoven University of Technology, in the Netherlands (2011-2013).

Her research interests include inventory management, assortment planning, retail operations, behavioral operations management and transportation theory. She has published papers in journals such as Management Science, Operations Research, MSOM and POMS. She is an Associate Editor for the Management Science journal, a board member of the Production and Operations Management Society, the Junior VP of meetings for the Women in OR/MS organization and the VP of communications for the POMS College of Supply Chain Management.

In 2010, she received the Regents' Outstanding Teacher Award from the Board of Regents of the University of Texas system and in 2011 she received the Trammell/CBA Foundation Teaching Award for Assistant Professors. Her paper "Assortment planning with vertically differentiated products" received the Wickham Skinner Best Paper Published in Production and Operations Management during 2012 Award.

Dorothee received her Undergraduate and Master's degrees in Business Administration from the University of Liege, in Belgium and a Ph.D. in Operations Management from New York University.

Panos KOUVELIS is the Director of the Boeing Center for Technology, Information, and Manufacturing, and Emerson Distinguished Professor of Operations and Manufacturing Management at Olin Business School, Washington University in St. Louis. Prior to joining Olin, he served as an associate professor at the Fuqua School of Business at Duke University and as an assistant professor at the University of Texas at Austin. He has published three books and over 100 papers in top-quality academic journals. Kouvelis has held visiting appointments with the Graduate School of Business, University of Chicago, where he taught in the executive programs in Barcelona, Chicago and Singapore, WHU- Koblenz School of Management, Germany, and Singapore Management University, Singapore. He has consulted with and/or taught executive programs for Emerson, IBM, Dell Computers, Boeing, Hanes, Duke Hospital, Solutia, Express Scripts, Spartech, MEMC, Ingram Micro, Smurfit Stone, Reckitt & Colman, and Bunge on supply chain, operations strategy, inventory management, lean manufacturing, operations scheduling and manufacturing system design issues.

Serguei NETESSINE is The Timken Chaired Professor of Global Technology and Innovation at INSEAD and the Research Director of the INSEAD-Wharton alliance. Prior to joining INSEAD in 2010, he has been a faculty member at the Wharton School, University of Pennsylvania.

Prof. Netessine received BS/MS degrees in Computer Science and Electrical Engineering from Moscow Institute of Electronic Technology and, after working for Motorola and Lucent Technologies, he also received MS/Ph.D. degrees in Operations Management from the University of Rochester. His current research focuses on business model innovation and operational excellence and he worked on these topics with numerous organizations including Federal Aviation Administration (USA), Lockheed Martin, Procter & Gamble, McDonald's, Rolls Royce, Comcast, Expedia, ABB and US Air Force. He serves on advisory boards of multiple startup companies and regularly speaks on Innovation and Entrepreneurship.

Professor Netessine has been the recipient of several teaching awards for delivering classes to MBA and Executive MBA students at the Wharton School and INSEAD, and he frequently teaches in Executive Education Programs. Prolific academic writer, professor Netessine holds senior editorial positions at several leading academic journals and he co-authored dozens of publications in prominent management journals, including *Management Science*, *Operations Research*, *Harvard Business Review* and other. His work has received extensive media coverage in *CIO Magazine*, the *Economist*, *Forbes*, *Multichannel Merchant*, *New York Times*, *US News* and *Strategy & Business* and other press.

His latest book [The Risk-Driven Business Model: Four Questions that will Define Your Company](#) has been published with Harvard Business Press in 2014.