Operations Management Summer Camp 2018

Date: **Friday, 17 August 2018**

Venue: **Singapore Management University (SMU)**
Lee Kong Chian School of Business
Level 2, Seminar Room (SR) 2.8

Programme	
9.45am – 10.15am	**Registration (outside SR 2.8)** **Morning Refreshment @ Catering area 2A, near SR 2.8, Level 2**
10.15am - 10.30am	**Opening Speech by Professor Gerry George, Dean of Lee Kong Chian School of Business, Singapore Management University**
10.30am - 11.30am	**Paper 1** **Presenter: Yun Fong LIM, SMU** **Discussant: Chung Piaw TEO, National University of Singapore** **Title: Matching Supply with Demand for Online Retailing** Abstract: **Problem definition**: An important characteristic that differentiates online retailers from brick-and-mortar retailers is that the former can choose which fulfillment centers (FCs) to satisfy demand. Although this flexibility improves service levels, it may increase the fulfillment cost and complicates inventory allocation and replenishments to the FCs. Therefore, we consider a joint replenishment, allocation, and fulfillment (JRAF) problem over multiple periods: In each period, an online retailer determines the replenishment quantity for each product from each supplier and then allocates the inventory to the FCs.

	After the demand is realized, the retailer chooses the FCs to satisfy it. The retailer's objective is to minimize the expected total cost. **Academic/practical relevance**: The aggressive expansion in e-commerce sales, which will amount to $4.058 trillion by 2020 (eMarketer, 2016), creates greater challenges to the online retailers' operations. Our methodology can make them more competent in this extremely competitive industry. **Methodology**: The JRAF problem is generally intractable due to stochastic demand, which motivates us to develop a two-stage approach based on robust optimization to solve it. The first stage is to decide whether a product should be replenished from each supplier in each period (a binary decision). We pass these binary decisions to the second stage, where we determine the replenishment, allocation, and fulfillment quantities. **Results**: A case study with a major apparel online retailer in Asia suggests that the two-stage approach can reduce the retailer's current cost by 36.73%, demonstrating a significant value of joint optimization. A more general study confirms that the two-stage approach can handle realistic problem sizes and performs very close to a benchmark with perfect information. **Managerial implications**: This is the first paper that integrates the replenishment, allocation, and fulfillment decisions in one model and our novel methodology can solve real-size problem instances (up to 1,000 products) of online retailing.
11.30am - 12.30pm	**Paper 2** **Presenter: Buket AVCI, SMU** **Discussant: Tunay TUNCA, University of Maryland** **Title: Optimal Procurement from Multiple Contracts in Agricultural Processing: Implications for Biomass Commercialization** Abstract: This paper studies the procurement strategy of an agricultural processor that sources a commodity input from two quantity-flexibility contracts to produce and sell a commodity output and biomass in the presence of input and output spot price uncertainties. Our objective is twofold. First, we investigate how spot price correlation affects the processor’s procurement strategy, profitability and the value of contract procurement. We show that while profitability decreases in correlation both in the presence and absence of contract procurement, the value of contract market increases in correlation---that is, contact market

	provides a hedge against increasing spot price correlation. Second, we examine the economic and environmental effects of biomass commercialization and the role of processor's procurement strategy in these effects. We identify the biomass demand as a critical factor. In particular, when the biomass demand is low (which we denote as experimental stage) a higher biomass demand increases the additional profit and decreases the net (greenhouse gas) emissions from biomass commercialization---that is, economic and environmental objectives are aligned. However, when biomass demand is high (which we denote as maturity stage) a higher biomass demand increases both the additional profit and net emissions from commercialization---that is, economic and environmental objectives are conflicting. We also find that biomass commercialization leads to negative net emissions, i.e., it is environmentally friendly, only when the biomass demand is not very high; otherwise it is environmentally unfriendly.
12.30pm - 1.45pm	**Lunch @ Catering area 2A, near SR 2.8, Level 2**
1.45pm - 2.45pm	**Paper 3** **Presenter: Yini GAO, SMU** **Discussant: Terry TAYLOR, University of California, Berkeley** **Title: Dilemma of Status Goods Sellers: Embrace Online Marketplace Beside Counterfeits, or Not?** Abstract: The expansion of the online marketplace have led to many firms leveraging on this new market channel to increase their access to consumers. However, the online marketplace is also one of the main propagators of counterfeits of status goods. Thus, the benefits and drawbacks of the online marketplace is ambiguous for the status good sellers, who have also been inconsistent in their engagement efforts. To study the dilemma faced by status good sellers, we adopt a two-period game-theoretic framework to examine the strategic interactions between a status good authentic seller, a counterfeit seller and an online marketplace. We find that the online marketplace never deters the counterfeit seller and an authentic seller collaborates with the online marketplace when it has a relatively low production cost but a high direct channel operating cost despite the presence of counterfeits. This is particularly so when the counterfeits are of low quality and high resemblance. Our findings also show that the counterfeit firm can discourage the authentic firm from the online marketplace when the quality of the counterfeit product is high, which offers an alternative explanation for the

	increasing quality of counterfeits. Our findings also propose that the authentic firm sets up its own online store as a strategy to counter the prevalence of counterfeits in online marketplaces. Finally, we find that social welfare mostly increases but consumer welfare decreases when the authentic firm does not avoid the online marketplace.
2.45pm - 3.45pm	**Paper 4** **Presenter: Xin FANG, SMU** **Discussant: Ying-Ju CHEN, Hong Kong University of Science and Technology** **Title: Impacts of Social Comparison Behavior on Corporate Social Responsibility: Power of the Small** Abstract: Motivated by the emergence of various corporate social responsibility (CSR) rankings and awards, we study the impacts of social comparison behavior of firms on CSR in a supply chain, consisting of one manufacturer and one retailer. Both the manufacturer and the retailer can choose to make CSR investment, which attracts CSR-concern consumers. We consider two types of social comparison behavior: ahead seeking that makes one willing to overperform relative to others, and ahead averse that results in underperforming. We find that if the retailer is a large enterprise who has strong negotiation power in the supply chain, his ahead-seeking behavior cannot motivate the up-tier manufacturer to increase CSR investment. In contrast, if the retailer is small, his ahead-seeking behavior can lead to significant increase in the manufacturer's CSR investment. This is because the increased market share achieved by the small ahead-seeking retailer makes it profitable for the manufacturer to increase CSR investment. Interestingly, the total CSR investment of the supply chain is also higher with the small ahead-seeking retailer than that with the large ahead-seeking retailer. On the other hand, the ahead-averse behavior of the retailer increases the manufacturer's CSR investment if the retailer is large, whereas it reduces the manufacturer's investment if the retailer is small. While many CSR rankings and awards are for large firms in practice, our results suggest that governments and NGOs should pay more attention to small firms, motivating their ahead-seeking behavior or deterring ahead-averse behavior through rankings and awards. Measures to promote consumers' social consciousness are also helpful to leverage the benefit of ahead-seeking behavior or to offset the negative effect of ahead-averse behavior.
3.45pm - 4.15pm	**Tea Break @ Catering area 2A, near SR 2.8, Level 2**

4.15pm - 5.15pm	**Paper 5** **Presenter: Shantanu BHATTACHARYA, SMU** **Discussant: Burak KAZAZ, Syracuse University** **Title: Managing public-private partnerships for the development of drugs for neglected diseases** Abstract: Neglected diseases disproportionately affect developing countries, but privately held firms in the bio-pharmaceutical sector lack adequate financial incentives to invest in the development of drugs for these diseases. In this paper, we analyze optimal contractual arrangements in a Research and Development (R&D) partnership between a funding agency with a social objective such as a non-governmental organization (NGO) or government agency with innovation and marketing specialists that are privately held to develop drugs for neglected diseases. The NGO has a limited budget to allocate to both firms to incentivize their participation in the drug development process. We characterize the conditions under which a disease should be labeled as a neglected disease and needs funding support from external socially-minded agencies. We also analyze the efficacy of different outcome-based contracts offered by the NGO in providing adequate incentives to privately held firms who are designated as an innovator and marketer to invest in the treatment of neglected diseases. Our results indicate that marketers should be offered contracts that are designed around royalty payments, and milestone payments should be used specifically to induce the marketer to participate in the drug development process, while innovators can be offered a mix of milestone and royalty payments. Fixed fees can also be used in the place of milestone payments to the marketer to make the allocation of resources from the limited budget of the NGO or government agency more efficient.
5.15pm - 5.30pm	**Concluding Remarks**
5.30pm	**End of OM Summer Camp 2018**

Discussants' Profile:

Chung Piaw TEO is Provost Chair Professor and Director of the Institute of Operations Research and Analytics in NUS. Prior to his current appointments, he was Acting Deputy Dean, Vice-Dean of the Research & PhD Program as well as Head of Decision Sciences Department at NUS Business School. He was an Eschbach Scholar in Northwestern University (US), Professor in Sungkyunkwan Graduate School of Business (Korea), and a Distinguished Visiting Professor in YuanZe University (Taiwan).

His research interests lie in service and manufacturing flexibility, discrete optimization, ports container operations, matching and exchange, and healthcare. He is currently a department editor in MS (Optimization), and was an area editor for OR (Operations and Supply Chains). He has also served on several international committee such as the Chair of the Nicholson Paper Competition (INFORMS, US), member of the IMPACT Prize Committee (INFORMS, US), Fudan Prize Committee on Outstanding Contribution to Management (China), and the Hong Kong PhD Fellowship Scheme Selection Panel.

Tunay Tunca is a Professor of Management Science and Operations Management at Robert H. Smith School of Business at University of Maryland. He received his PhD in Business Administration and MS in Financial Mathematics from Stanford University, MS in Management Science from the University of Rochester, and BS degrees in Electrical Engineering and Mathematics with honors from Bogazici University. Prior to joining University of Maryland, he was an Associate Professor of Operations, Information, and Technology at Graduate School of Business at Stanford University. Professor Tunca has also been a visiting scholar at the Sloan School of Business at Massachusetts Institute of Technology, Wharton School of Business at University of Pennsylvania, Yahoo Inc., and Hewlett-Packard. His research interests include economics of operations and technology management, operations management in the sharing economy, theoretical and empirical analysis of procurement contracts and processes, and forecasting, risk and financing in supply chains. His research has won awards and recognitions from Management Science, M&SOM, POMS and CSAMSE. He is an Associate Editor for the journal M&SOM. He is the winner of a number of teaching awards at University of Maryland, including the 2014 Allen J. Krowe Teaching Excellence Award, and Distinguished Teaching Awards for 2015-2018.

Terry TAYLOR is the Milton W. Terrill Chaired Professor of Business Administration at the Haas School of Business. Dr. Taylor's research and expertise includes supply chain management, economics of operations management, social responsibility in operations management, sharing economy platforms, and marketing-operations interface. He is a Departmental Editor for POMS and an Associate Editor for Management Science, M&SOM, and Operations Research.

In addition to being a three-time recipient of the Earl F. Cheit Award for Excellence in Teaching, Dr. Taylor has been named a Top MBA Professor by Bloomberg BusinessWeek as well as one of the Best 40 B-School Profs Under the Age of 40 by Poets & Quants.

Ying-Ju CHEN holds a joint appointment between School of Business and Management (Department of ISOM) and School of Engineering (Department of IEDA) at HKUST. Prior to the current position, he was a faculty in the Department of IEOR at UC Berkeley. He obtained a PhD degree in Operations Management from Stern School of Business at New York University in 2007, and he also holds master's and bachelor's degrees of Electrical Engineering from National Taiwan University.

He is a recipient of NYU teaching excellence award, Recognition of Excellent Teaching Performance at HKUST Business School, Harold W. Kuhn Award of Naval Research Logistics, Second place of INFORMS Junior Faculty Interest Group (JFIG) paper competition, Higher Education Outstanding Scientific Research Output Award (Social Science, third prize), Best paper award of CSAMSE (third prize), the Harold MacDowell Award from Stern School, 6-time Meritorious Service Awards from Management Science and Manufacturing & Service Operations Management, and other awards and fellowships during his academic journey. He is ranked No. 5 among researchers in Asia and Australasia by frequency of authorship in Operations Management, according to an article in Int. J. Prod. Eco. (2017).

He serves as an associate editor for M&SOM journal. His current research interests lie in socially responsible operations, operations-marketing interface, and supply chain management. His work has appeared in several leading journals in the fields of economics, electrical engineering, information systems, marketing, and operations research.

Burak Kazaz is the Steven Becker Professor of Supply Chain Management, the Laura J. and L. Douglas Meredith Professor for Teaching Excellence at the Whitman School of Management, Syracuse University. Prior to this appointment, he was a faculty member at the University of Miami and at Loyola University of Chicago, taught at the Executive Education programs of the University of Chicago, and he was a visiting professor at Cornell University and the University of California Berkeley. Dr. Kazaz received his Bachelor’s and Master’s degrees in Industrial Engineering from Middle East Technical University in Turkey and his Ph.D. from the Krannert Graduate School of Management at Purdue University.

Dr. Kazaz’s research interests include risk mitigation, supply chain finance, and socially-responsible supply chains. He established the field of “wine analytics,” and his work on the pricing of wine futures has been highly influential in the wine industry benefiting winemakers and distributors. His publications can be found in premier journals such as *Manufacturing & Service Operations Management, Management Science, Operations Research, and Production and*

Operations Management. His impact is evidenced in that he is frequently featured in popular media including Wine Spectator, Forbes, Bloomberg, Financial Times and the fine wine stock market Liv-ex. Dr. Kazaz's papers have been the recipient of numerous awards: The **2017 Wickham Skinner Prize**, the **2016 Best Paper Award** from the College of Humanitarian Operations and Crises Management, the **2015 INFORMS President's Pick** and the **2014 Best Analytical Paper Award** from the Decision Sciences Institute.

Dr. Kazaz presently serves as the Chair of the iFORM special interest group under INFORMS, as an Associate Editor for *Manufacturing & Service Operations Management*, as a Senior Editor for *Production and Operations Management*, and as an Area Editor for *IIE Transactions*. Dr. Kazaz's teaching has been recognized with numerous awards. In 2012, he is named as the Meredith Professor for Teaching Excellence, the highest honor given at Syracuse University. He served as the Whitman Teaching Fellow from 2010 to 2012 and is the recipient of the first-ever Whitman School of Management Teaching Innovation Award in 2011.