Guest Editorial

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This special issue features articles from the 9th Annual INFORMS Revenue Management and Pricing Section Conference at the Kellogg School of Management, Northwestern University during 22–23 June 2009. The conference featured 42 half hour talks by practitioners and researchers, as well as keynote addresses by Professor Anton Kleywegt of Georgia Tech and by Dr Matthew Schrag, the Director of Operations Research and Industrial Engineering at Delta Airlines. The conference was organized by Martin Lariviere and Baris Ata. In 2011, this conference will be organized at Columbia University, in New York, in June and we look forward to seeing you there.

Throughout its development, the field of revenue management has been characterized by a strong interaction between applications and theory that continue to motivate both academic research and industry innovations. The papers featured in this special issue published for the 9th INFORMS Revenue Management and Pricing Conference highlight this interaction by showcasing the application of revenue management in a new application domain, incorporating strategic consumer behavior in pricing and network capacity control settings, and exploring the joint use of dynamic pricing and capacity controls in airline revenue management.

Recently, there has been a growing interest in the use of quantitative modeling in a variety of applications within the healthcare sector. The paper by Ayvaz and Huh titled ‘Allocation of hospital capacity to multiple types of patients’ discusses a novel application of revenue management and inventory control methods to optimize the usage of hospital beds in settings with constrained capacity and heterogeneous patient needs. The authors formulate an interesting control problem, which leads to powerful structural insights

about the form of optimal policies and produces implementable heuristics with good performance. Historically, the hospital bed allocation problem has been considered to be very complicated and has been addressed with simple rules-of-thumb that do not adequately capture, however, the economic and performance tradeoffs that underlie these decisions. Ayvaz and Huh make some important progress on this significant problem. Separately, their paper is part of a recently growing literature that attempts to introduce revenue maximization considerations as a guide for decision making in the context of healthcare, which is promising both methodologically and in terms of its potential practical impact.

Many revenue management systems do not explicitly model the strategic consumer choice behavior in their demand forecasts and downstream pricing and capacity control decisions. Instead rely on the fact that historical forecasts do capture the ‘aggregate’ effect of this choice behavior and as such may lead to good control decisions. Examples where consumer behavior may be relevant include their choice among alternative itineraries, different flight times or days, advance purchase of a retail good at a higher price as opposed to trying to purchase the item later on a sale, if available and so on. Recent research has shown that models that explicitly account for the detailed consumer choice behavior may lead to significantly better results. The remaining three papers in this special issue study the effect of consumer choice in different settings and provide methodological tools to incorporate it into revenue management decisions.

In ‘Pricing structure optimization in mixed restricted/unrestricted fare environments’, Meissner and Strauss study a network revenue management problem, such as the one faced by

airlines, where the seller offers both restricted fare products that ‘opened’ or ‘closed’ according to inventory and demand conditions, and products whose price is dynamically adjusted. This model is motivated by major airlines that typically operate with a product menu with predetermined fares that have to compete these days with lower-cost carriers that typically dynamically price their products as time, inventory and demand forecasts evolve. Integrating the two different types of controls is no simple task. Moreover, capturing the effect of consumers choosing one product versus another is crucial in designing good control policies. In their paper, Meissner and Strauss provide a framework for studying these problems, highlight their structure and complexity, and provide an algorithm that is practically implementable in large case settings and leads to significant revenue improvement.

In a related context, Kunnumkal and Topaloglu study a network revenue management problem where the seller selects a price menu for each possible itinerary and consumers make purchase decisions according to a set of known demand functions. Prior results have shown that static pricing strategies, that is, strategies that select a state and time independent price for each itinerary are asymptotically optimal in network settings with large capacities. One way to select this vector of prices is by solving a deterministic optimization problem that disregards the stochastic nature of demand. There has been little work in the literature that tries to refine this heuristic either using some form of dynamic pricing or by adjusting the static price vector in a way that reflects the effect of stochastic variability. This paper does the latter and suggests a tractable and implementable approach that uses a stochastic approximation approach to optimize the expected revenue function, which is very hard to analyze with a head-on approach. The results obtained by Kunnumkal and Topaloglu are analytically interesting and also highlight the significant revenue lift that one can obtain

by refining the deterministic heuristics mentioned above. Static pricing is, of course, practically appealing, and this paper provides an interesting to this problem in the settings where the firm is selling – or operating – a network of resources that are consumed in the process of offering a set of different products or services. Apart from airlines or hotels, this could be of interest in manufacturing and service systems as well.

Pricing history affects purchase behavior. Consumers observe past prices and form estimates about the ‘fair’ value of the product and adjust their purchase behavior accordingly; they form expectations about upcoming sales or promotions and adjust the timing of their purchase. There has been an increasing interest in incorporating behavioral and strategic aspects of consumers in pricing and revenue management. The fourth and last paper of this special issue titled ‘A two-stage multi-period negotiation model with reference price effect’ by Huh, Kachani and Sadighian studies the pricing problem faced by a seller that operates in a market with heterogeneous customers: one group observes the price history and formulates a reference price, which it then uses in its purchase decision; the other group decides on whether to purchase based on solely the current price at the time of their arrival. The strategic behavior of the former group captures some aspects of customers that bargain for the goods, which is another practically important feature in expensive goods and business-to-business applications. The authors devise a two period pricing policy that incorporates the consumer choice effects. They show that it is optimal to dynamically price the product over its horizon (two periods in their model) to discriminate between strategic and myopic customers. The impact on the firm’s revenue is significant. The same insights hold in competitive settings. Finally, apart from its methodological contributions, this paper offers a fairly tractable framework for managers to adopt in studying such dynamic pricing decisions.

In addition, this special issue includes a futures article by Steve Pinchuk who writes about Nano Entity Economics suggesting improvements to the supply chain and revenue management. And, Scott Nason reviews of Chris Anderson's business best-seller, *Free: The future of a Radical Price*.

In closing, I would like to thank all the referees and associate editors that were involved in the review process of the manuscripts that were submitted to this special issue.

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