

Industrial & Systems Engineering Seminar

“Coverage, Coarseness and Classification: Determinants of Social Efficiency in Priority Queues”

Wednesday, September 7

3:15 PM - Refreshments, 3:30 - Graduate Seminar

Mechanical Engineering Room 4125 A & B



Professor Martin Lariviere

*John L. and Helen Kellogg Professor of
Managerial Economics & Decision Sciences*

*Northwestern University's Kellogg School of
Management*

Many service providers utilize priority queues. Many consumers revile priority queues. However, some form of priority service may be necessary to maximize social welfare. Consequently, it is useful to understand how the priority scheme chosen by a revenue-maximizing firm differs from that a social planner would impose. We examine this in a single server-queue with customers that draw their valuation from a continuous distribution and have a per-period waiting cost that is proportional to their realized valuation. The decision maker must post a menu offering a finite number of waiting time-price pairs. There are then three dimensions on which a revenue maximizer and social planner can differ: coverage (i.e., how many customer in total to serve), coarseness (i.e., how many classes of service to offer), and classification (i.e., how to map customers to priority levels).

We show that differences between the decision makers priority policies are all about classification. Both are content to offer very coarse schemes with just two priority levels and they will have negligible differences in coverage. However, differences in classification are persistent. Further, a revenue maximizer may — relative to the social planner — have too few or too many high priority customers. Whether the revenue maximizer over- or under-stuffs the high priority class depends on a measure of consumer surplus that is captured by the mean residual life function of the valuation. In addition we show that there is a large class of valuation distributions for which a move from first-in, first-out service to a priority scheme that places those with higher waiting costs at the front of the line reduces consumer surplus.

BIO:

Martin Lariviere joined the Kellogg School of Management in 2000 and is the John L. and Helen Kellogg Professor of Operations. His work has appeared in *Management Science*, *M&SOM*, *Operations Research*, *Harvard Business Review* and *Sloan Management Review*. He has held a variety of editorial positions including serving six years as a Departmental Editor at *Management Science*. He has also held a number of leadership positions in the Manufacturing and Service Operations Society of INFORMS. He is a Distinguished Fellow of the MSOM Society and a recipient of the Saul Gass Expository Writing Award.