

The Hong Kong Polytechnic University
Department of Logistics and Maritime Studies
Research Seminar

Efficient Ignorance: Information Heterogeneity in a Queue

by

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Time: 11:00am - 12:00nn
Venue: R407, Shirley Chan Building
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(Conducted in English)

Abstract:

How would the growing prevalence of real-time delay information have an impact on a service system? We consider a single-server queueing system where customers arrive according to a Poisson process and service takes an exponential time. There are two streams of customers, one informed about real-time delay and one uninformed. We characterize the equilibrium behavior of customers who may balk in such a system and investigate how a larger fraction of informed customers affects the system performance measures, i.e., throughput and social welfare. We show that the impacts of growing information prevalence on system performance measures are determined by the equilibrium joining behavior of *uninformed* customers. Perhaps surprisingly, we find that throughput and social welfare can be *unimodal* in the fraction of informed customers. In other words, some amount of information heterogeneity in the population can lead to strictly more efficient outcomes, in terms of the system throughput or social welfare, than information homogeneity. For example, under a very mild condition, throughput of a system with offered load being 1 will always suffer if there are more than 58% of informed customers in the population. Moreover, it is shown that for an overloaded system with offered load sufficiently higher than one, social welfare always reaches its maximum when some fractions of customers are uninformed of the congestion in real time.

Bio:

Jianfu Wang is an Assistant Professor of operations management at the Nanyang Business School, Nanyang Technological University. He received his Ph.D. degree from Rotman School of Management, University of Toronto, in 2014. His research interests include queueing theory and its application in service operations, healthcare operations, revenue management, and information economics.

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All are welcome!