The Hong Kong University of Science and Technology

Dept of Information Systems, Business Statistics
and Operations Management

Zoom Webinar Announcement

Structural Estimation of Intertemporal Externalities on ICU Admission Decisions

by

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Date	:	**19 November 2020 (Thursday)**
Time	:	**9:00 - 10:30 pm**
Venue	:	**Online via Zoom**

Abstract: Service systems' behavior can be affected by multiple factors. In the case of intensive care units (ICUs), which admit patients from four primary loci (the emergency department (ED), scheduled patients, planned transfers from other ICUs, and unplanned transfers), it is known that admission rates of some patients decrease as occupancy increases. It is also known that, for at least some conditions, ICU admission is not just a function of patients' illness. Instead, a significant proportion of the variation in ICU admission rates is due to hospital, not patient, factors. In this paper, we employ two years of data from patients admitted to 21 Kaiser Permanente Northern California ICUs from the ED. We quantify the variation in ICU admission from the ED under varying degrees of ICU and ED occupancy. We find that substantial heterogeneity in admission rates is present, and that it cannot be explained either by patient factors or occupancy levels alone. We use a structural model to understand the extent that intertemporal externalities could account for some of this variation. Specifically, we identify the discount factor in the structural model from observed data using a novel econometric approach. We find there is large heterogeneity in the discount factors across hospitals, suggesting they behave very differently when balancing the short and long-term considerations. Using counterfactual simulations, we show that, if hospitals had more information regarding their behaviors, and if it were possible to alter hospital admission processes to incorporate such information, hospitals could reduce ICU congestion safely. This type of intervention can be implemented via a simple heuristic policy that achieves most of the benefit.

Biography: Yiwen Shen is a fifth year PhD student in the Decision, Risk, and Operations Division at Columbia Business School. His research combines empirical methods with analytic models to provide data-driven insights into the management of large systems such as in healthcare and financial engineering. In healthcare management, his work focuses on understanding the operational and behavioral impact on system outcomes with data in different healthcare settings. His topics in financial engineering include information dynamics, optimal portfolio allocation in incomplete markets, and high-frequency data analytics. His research leverages a broad set of skills, e.g., stochastic modeling, optimization, big data analytics, and structural estimation. Before PhD, Yiwen obtained a bachelor's degree in physics from Peking University and a master's degree in financial engineering from Columbia University.

All interested are welcome!

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