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Revenue-maximizing pricing and scheduling strategies in service systems with flexible customers

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Revenue-maximizing Pricing and Scheduling Strategies in Service Systems with Flexible Customers

Abstract

We propose a model of service operations systems in which customers are heterogeneous both in terms of their private delay sensitivity and flexibility. A service provider maximizes revenue through jointly optimal pricing and steady-state scheduling strategies. We provide a complete analysis for this generally intractable problem. Interestingly, when one queue accommodates a large population of impatient customers, it may be desirable to strategically idle the server in the other queue, which is a phenomenon new to the literature.

Keywords: service operations systems; flexible customers; information asymmetry; priority pricing; scheduling

1 Introduction

This paper provides a holistic analysis for the design of revenue maximizing policies in service systems when the customers demonstrate weak taste preference, and explores the impact of different information structures and the discriminatory mechanisms on the system performance. We seek to design the service mechanism (prices, expected delays, etc.) when some customers are flexible across multiple service options. Examples of flexible customers include polylingual customers in call centers, opaque selling in e-commerce delivery service, and grocery substitution in fresh-product delivery service such as Walmart Grocery and Amazon Fresh.

Our models are related to the growing literature on flexible service systems. Since this line of research has long root in the operations research literature, we refer the reader to [1] for an overview of earlier papers, where the flexibility structure in our model is denoted as *W-design*. For partially pooled systems in general, system performances across different designs are compared in