

Chen, Yiwei; Shi, Cong

Joint pricing and inventory management with strategic customers. (English) Zbl 1444.90061
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Summary: We consider a model wherein the seller sells a product to customers over an infinite horizon. At each time, the seller decides a set of purchase options offered to customers and the inventory replenishment quantity. Each purchase option specifies a price and a product delivery time. Customers are infinitesimal and arrive to the system with a constant rate. Customer product valuations are heterogeneous and follow a stationary distribution. Customers' arrival times and product valuations are their private information. Customers are forward looking; that is, they strategize their purchasing times. Customers incur delay disutility from postponing to place an order and waiting for the product delivery. Customers' delay disutility rates are perfectly and positively correlated with their valuation. The seller has zero replenishment lead time. The seller incurs fixed ordering cost and inventory holding cost. The seller seeks a joint pricing, delivery, and inventory policy that maximizes the seller's long-run average profit. Through a tractable upper bound constructed by solving a mechanism design problem, we derive an optimal joint pricing, delivery, and inventory policy, which is a simple cyclic policy. We also extend our policy to a stochastic setting and establish its asymptotic optimality.

The e-companion is available at <https://doi.org/10.1287/opre.2019.1857>.

MSC:

- 90B50 Management decision making, including multiple objectives
- 90B05 Inventory, storage, reservoirs
- 90B06 Transportation, logistics and supply chain management
- 91B24 Microeconomic theory (price theory and economic markets)

Keywords:

joint pricing and inventory control; strategic customers; optimal policy; mechanism design

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