

Optimal Ordering Policy for Perishable Items in an Advanced Booking System with Stochastic Reservation Cancellations

Ming-Guan Huang

Shih Chien University

Abstract

Advanced booking and reservation policies involving perishable items have been extensively applied in striving to deal with volatile demand in a highly competitive marketplace. Furthermore, retailers of perishable items generally allow customers with a reservation to arbitrarily cancel their advanced bookings in order to encourage sales. Under this circumstance, retailers have difficulty in making precise order quantity decisions, especially for the higher rate and volatility involved in reservation cancellations. Accordingly, this study extends the newsvendor model to allow for advanced booking system with stochastic reservation cancellations. A transformation model for the cancellation rate variable is also developed here to conform to lognormal distribution, which is considered as more realistic and accurate for cancellations behavior. Additionally, an effective and practical ordering model for retailers is eventually developed to optimally determine the order quantity of a given perishable item during an upcoming selling period in an advanced booking system with stochastic reservation cancellations. Numerical example demonstrates that the proposed optimal ordering model in this study can find an optimal solution to maximize the expected profits of retailers. Moreover, some valuable findings for managerial reference are revealed through conducting sensitivity analysis.

Keywords: Newsvendor model, booking system, reservation cancellations, perishable items.

1. Introduction

Many strategic policies have been developed to reduce the risk of demand uncertainty, which is normally owing to a highly competitive environment and fluctuating customer preferences. Of those policies, advanced booking is a highly effective means of allowing suppliers or retailers to reduce demand uncertainty and potentially boost profits. Advanced booking is defined here as a situation in which a supplier/retailer sells items through a booking system when customers make a reservation and, then, customers receive the sold item on a future date. In practice, retailers have extensively adopted advanced bookings to sell their perishable physical items (e.g., food and fashion